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CIS

WORLD PETROLEUM OUTLOOK—1982

HEARING

BEFORE THE

COMMITTEE ON ENERGY AND NATURAL RESOURCES UNITED STATES SENATE

NINETY-SEVENTH CONGRESS

SECOND SESSION

TO REVIEW THE NEAR-TERM OUTLOOK FOR INTERNATIONAL SUPPLIES OF OIL, AND TO EXPLORE THE VARIOUS FACTORS WHICH MAY AFFECT THIS SUPPLY

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WORLD PETROLEUM OUTLOOK—1982

FRIDAY, APRIL 23, 1982

U.S. SENATE,
COMMITTEE ON ENERGY AND NATURAL RESOURCES,
Washington, D.C.

The committee met, pursuant to notice, at 10:10 a.m., in room 3110, Dirksen Office Building, Hon. James A. McClure, chairman, presiding.

Present: Senators McClure and Bradley.

Also present: Howard Useem, professional staff member; and James T. Bruce, counsel for the minority.

OPENING STATEMENT OF HON. JAMES A. McCLURE, A U.S. SENATOR FROM THE STATE OF IDAHO

The CHAIRMAN. The committee will come to order. Today the Committee on Energy and Natural Resources is holding a hearing on the world petroleum outlook. The purpose of this hearing is to review the near-term outlook for international supplies of oil, and to explore the various factors which may affect this supply.

In the face of an apparently stable oil market, we are all too quick in forgetting just how potentially fragile the world oil market is. In the current euphoria over increased supplies and diminishing prices many have forgotten how people act or react in a period of threatened shortage.

The unpredictability of the international energy situation has been amply demonstrated by the Iraq/Iran war which could have spread to neighboring regions or could have affected shipments of oil through the Straits of Hormuz. If any one of a dozen possible events had occurred during the past year, we could again be facing the specter of gasoline lines, shortages of home heating oil, or farmers unable to obtain fuel for spring planting and trucks sidelined for want of fuel.

Those of us who are concerned about a sufficient supply and balance of energy availability have neglected to note that there is a moral dimension to meeting that challenge. There is a moral dimension to meeting the needs of the people, and there is a moral dimension if we fail to meet those needs.

What too many people forget is that nations go to war when their survival is threatened. The threat of war, given the unpredictable nature of the international situation, is very real. If our survival is threatened because of the interruption of energy supply halfway around the world, we have failed terribly in the responsibility that we have to our country and to our people.

The unpredictability of the situation has been amply demonstrated over the past year. A year ago most energy experts were predicting that the world oil market would remain tight through 1981 and that if anything, oil prices would be on the upswing.

Now that we have the benefit of 20/20 hindsight, we see just how wrong those predictions were. Over the past year, the so-called oil glut has caused the price of gasoline and heating oil to stabilize and recently to fall somewhat. The United States is now importing only 3.6 million barrels of crude and product per day, a 37 percent reduction from a year ago, and a 64 percent decrease from our all-time high of 10 million barrels per day during February, 1977.

I am confident that the hearing today will provide us with the latest analyses concerning the international oil situation and a better understanding of the forces which may affect it over the near term.

Our first witness this morning is Mr. Dennis O'Brien, Deputy Assistant Secretary for International Affairs, Department of Energy. Welcome before us, Mr. Secretary, and we will make your entire statement a part of the record, and you are at liberty to deliver it all or highlight it and make whatever comments you wish.

STATEMENT OF DR. DENNIS O'BRIEN, DEPUTY ASSISTANT SECRETARY FOR INTERNATIONAL AFFAIRS, DEPARTMENT OF ENERGY, ACCOMPANIED BY JOHN BRODMAN, DEPARTMENT OF ENERGY

Dr. O'Brien. Well, thank you, Mr. Chairman, for permitting the Department of Energy to give their views on the current market situation. Briefly I intend to touch on the following items—first of all, a description of current oil markets as we see them; second, a recent OPEC decision to cut oil production and its short-term effects; and third, the outlook for the oil market for the remainder of the decade.

The world oil market has been extremely weak in 1982. Spot prices for a broad range of crude oil have dropped precipitously since mid-January with most spot prices running to $4 to $5 a barrel below the contract prices. The official sales prices have also slipped with the average price of internationally traded oil falling from $34.15 on the first of January of this year to $33.34 in the first week of April.

Many OPEC members have felt the pinch as sales have tumbled. OPEC revenues which declined from $265 billion in 1980 to an estimated $245 billion in 1981 may fall to an estimated $215 billion in 1982.

I think the key here is for every million barrels a day in terms of production, that is equal to about $10 billion annually in terms of revenues to OPEC. In an effort to boost sales, some members are selling oil at official discounts while others are selling at unofficial discounts through processing contracts with refiners, and other arrangements. We have heard estimates that 15 to 20 percent of OPEC oil is currently being sold under some form of discount. There are about five main driving factors as we see them for the current weak oil markets.

The first is basically the rapidly declining world oil consumption due to the poor economic performance in the industrialized countries, this coupled with structural adjustments in world oil demand resulting from the price shocks of 1973-74 and 1979 and 1980.

Second, the existence—and this is a very tenuous number—the existence of 7 to 8 million barrels per day of excess productive capacity worldwide, and this is a conservative estimate, and this number is probably more than at any other point in time in modern history.

Third, inventory liquidation motivated by the high cost of carrying inventories and the declining of operational requirements by not only oil companies but end users as well.

Fourth, attempts by some OPEC members to increase market shares as well as non-OPEC members in the face of declining consumption and competition from non-OPEC oil supplies.

Last, but I think perhaps in some ways most important, the perception of falling prices and oversupply helped create a self-fulfilling prophecy among buyers, traders, and sellers.

A combination of factors, including price increases 1973-74, and 1979-80, and declining economic performance in the industrialized countries, have had a very strong depressing effect on world oil consumption. Since 1979, oil consumption has declined some 5.3 million barrels a day. If this had not occurred, oil consumption could have been expected to continue at the 1976-79 growth rate of about 3 percent a year, and could have reached 55.6 million barrels a day in 1981. Looked at in that way, oil consumption is about 8.5 million barrels a day less in 1981 than could have been expected if historical trends had continued.

Economic growth and industrial production continued to lag behind expectations in late 1981 and early 1982. Economic recovery is not expected until the second half of 1982, and as a result, oil consumption will remain depressed in the coming months. Even when the economies of industrialized countries do take an upturn, the increased activity is not likely to create additional demand on world oil supplies enough to do more than arrest the decline in world oil consumption. This is largely due to the fact that oil consumers and investors responded to the price shocks of 1973-74 and 1979-80 by increasing energy efficiency and substituting other fuels for oil. These structural changes in the use of energy in industrialized countries have played an important role during the 1980-82 oil market and will continue to do so over the long run.

Another factor which has been important in depressing oil production and bringing about the steep decline in oil prices has been accelerated inventory liquidation during the winter of 1981 and 1982. In the wake of the supply disruptions brought on by the Iranian Revolution in 1979, companies and governments scrambled to build inventories—not only build inventories, but also inventory capacity—to record levels as insurance against market uncertainties. The additional oil inventory accumulated amounted to some 500, 600 million barrels worldwide. As consumption began to slide in response to higher prices and the economic downturn, companies found themselves with more inventories than they needed or were economic to hold.

In addition to the decline in oil consumption, increased excess productive capacity and the availability and adequacy of oil supplies, all of this provided further impetus for companies to reduce inventories in recent months, given the high cost of carrying excess inventories and the prospect of declining real prices in oil.

While consumption has been falling, the availability of oil supplies from non-OPEC sources, primarily the North Sea and Mexico, have been rising. In the period 1979–81, non-OPEC production increased from 20.7 million barrels a day to 22 million. In 1982, this should rise to about 22.7 million. This trend has reduced OPEC market shares with commensurate effect on OPEC production. Its effect has been particularly acute for OPEC this winter as plummeting consumption and large inventory liquidation has placed added pressure on OPEC production levels. As a result, OPEC crude oil production has dropped to about 18.5 to 19 million barrels a day in March of this year. This is a 6 to 6.5 million barrel a day production rate lower than March 1981.

Several OPEC members have had substantial losses of market shares and have responded by marketing crude more aggressively. Iran, Iraq, and Libya have discounted their prices officially and unofficially which has served to further weaken spot markets. Nigeria, whose light crude is officially priced at $35.50, has been under intense pressure since the price of competitive crudes from the North Sea was slashed to $31 a barrel. Buyers have opted not to lift Nigerian crude, and its production has dropped from a level of 1.8 million in January to approximately 900,000 barrels a day in March, and we see Nigeria basically the key to what happens in the future.

Current market trends have put intense pressure on the OPEC benchmark price of $34 per barrel. Most non-OPEC oil exporters have chosen the strategy of allowing prices to fall in order to keep oil sales up. Contract oil prices in non-OPEC producers have fallen from $3 to $3.50 below the OPEC price since January. OPEC, on the other hand, responded to these market pressures by deciding to maintain prices and cut production by adopting a system of production prorationing at their extraordinary meeting in Vienna last month. The new quota system designed to limit OPEC production to 18 million barrels a day, marked the first time in its 21-year history that OPEC has been able to agree, at least in principle to a production prorationing scheme. The quota system went into effect on April 1, and is scheduled to be reviewed at the next OPEC meeting in May in Quito.

Saudi production ceiling under the scheme continues to be 7.5 million barrels a day since the Saudis maintain that their production level is a sovereign issue, although they voluntarily reduced their production ceiling to 7 million barrels a day in April. This has made the effective production ceiling 17.9 million barrels a day.

The market impact of the recent OPEC decision to cut crude oil production to 17.5 million barrels a day will depend primarily on the evolution of world oil consumption for the remainder of the year, the current level of surplus commercial inventories and perhaps most important the ability of OPEC to maintain the new, lower production levels for a sufficient period of time.

With regard to this last point, Saudi Arabia's willingness to cut production further will remain a dominant factor in the evolution of the market in the short term. Saudi Arabia's decisions about future production cuts are likely to be based on essentially five things—their needs for income is obviously a consideration; their minimum technical production levels necessary to maintain the domestic natural gas collection system; their desire to maintain market shares; their perception of market conditions; and their determination to maintain their current level of influence within OPEC.

In any event, the recent OPEC decision to cut production is unlikely to have a significant short-term impact on the market. It is quite possible weak market conditions will force OPEC to reduce production by another half a million to a million barrels a day to stem the slide in oil prices. As long as companies continue to work off excess commercial inventories, the April 1 cut is at best only likely to arrest the decline in spot crude oil prices.

Under current market conditions, the OPEC decision to cut production to 17.5 million barrels a day is probably more important as a means of influencing market psychology than a means of redressing the actual imbalance between demand and supply.

Estimates of the magnitude of the inventory surplus vary widely, usually in the range of 300 to 600 million barrels as of April 1, this year. With non-OPEC oil consumption expected to be 3 to 3.5 percent below last year, OPEC may have to sustain the new production ceilings through the summer, possibly into the fall. Should consumption turn out to be lower, or OPEC production higher because of nonadherence to ceilings, it could take until the end of the year or later for the surplus to disappear. In either case, it would appear that maintenance of the new relatively low production levels may be extremely difficult to achieve given the diverse financial needs and resources of individual OPEC members. The longer the new low production levels remain in effect, the greater the internal strains within OPEC are likely to be, and the greater the chances of a significant price break on the part of the several OPEC producers, and again Nigeria is the key.

Even if OPEC can successfully maintain the new production cuts and weather the short-term downward pressure on prices, it will still be faced with the even greater task of allocating production in 1983. If current spare productive capacity within OPEC over and above the new production ceiling amounts to an estimated 7 point million barrels a day, and this is a key factor, this could quickly rise to 10 million barrels a day if the fighting between Iran and Iraq were resolved. With world demand for OPEC oil expected to rise at most by 3 million barrels a day from the 1982 depressed level, considerable strains are likely to develop from OPEC's attempt to continue to ration production and support price.

Given the amount of surplus productive capacity in the world, the continued decline in oil consumption, there would appear to be little except a major interruption in a major supplier which could reverse this current situation in the next 3 to 6 months. On balance, things are more likely to get worse for OPEC than better during this period.

For the remainder of 1982 and 1983, the major uncertainties are the effect of the expected economic upturn on oil consumption; second, the ever-present unresolved political tensions which could interrupt the flow of OPEC oil exports; third, oil company inventory policies; and fourth, the course of the war between Iran and Iraq. Unfavorable developments could push the world back into a tighter oil market in any of these areas, although the current weakness in the market probably puts the United States and other oil importers in a much better position to absorb such developments without rapid price escalation and shortages as was the case in 1973–74 and 1979–80.

For the rest of this decade, conditions in the world oil market will continue to be dominated by ongoing structural adjustments resulting from these past oil and other energy price increases, and also by the events which affect the major oil producing countries, particularly in the Persian Gulf region.

Assuming current oil prices continue, oil demand in the industrial countries is expected to remain relatively flat between 1983 and 1985, and decline slightly thereafter to 1990. This overall trend in the industrial countries' oil demand, however, is likely to be more than offset by rising oil demand within OPEC and non-OPEC developing countries. Declining oil production in the industrialized countries and the expected shift in the centrally planned economies from net oil exporters to net oil importers are likely to limit increases in non-OPEC supplies, especially in the period after 1985. In the absence of unexpected supply disruption, a gradual firming of the oil market in the period to the late 1980's will probably allow and support only a modest increase in real oil prices. In spite of this relatively optimistic outlook, however, the overall oil market situation and outlook will continue to be dominated by risk, uncertainty, and the persistent threat of unexpected supply disruptions.

The current favorable market cannot hide the fact that oil is a finite resource, heavily concentrated in relatively few countries, some of which are located in unstable regions of the world, nor does it alter the fact that one country, Saudi Arabia, produces about 40 percent of OPEC oil, and supplies perhaps 20 to 25 percent of the oil traded internationally.

Furthermore, the probable path of world oil prices remains highly uncertain. The longer the current so-called glut or oversupply in the world oil market persists into the early part of the decade, it is reasonable to assume the higher that global demand is expected to be into the later part of the decade. This might result in substantial upward price pressure. In the meantime, perceptions of oil company officials, traders, and end-use buyers will greatly influence the market on a day-to-day basis.

If market conditions remain stable, oil markets are likely to continue to slide or remain in equilibrium. The perception of a supply interruption, whether by war, embargo or natural disaster, could rapidly reverse the current market psychology and trigger another dramatic upturn in prices, inventory building, and perhaps short-term shortages.

We must be prepared to meet such eventualities by carefully following the oil trade in normal times as well as during a supply interruption and providing the executive branch and the Congress, the business community and the American public, with accurate information in order to prevent panic buying and unneccssary price and supply pressures.

Thank you very much.

[The prepared statement of Dr. O'Brien follows.]

DENNIS O'BRIEN

TESTIMONY BEFORE THE SENATE COMMITTEE ON
ENERGY AND NATURAL RESOURCES
APRIL 23, 1982

MR. CHAIRMAN AND DISTINGUISHED MEMBERS OF THIS COMMITTEE.

I WOULD LIKE TO THANK YOU FOR PERMITTING ME TO PRESENT THE DEPARTMENT OF ENERGY'S VIEWS ON THE CURRENT OIL MARKET SITUATION. BRIEFLY I INTEND TO TOUCH UPON THE FOLLOWING:

- A DESCRIPTION OF THE CURRENT OIL MARKET SITUATION AND HOW WE GOT TO WHERE WE ARE NOW;
- THE RECENT OPEC DECISION TO CUT OIL PRODUCTION AND ITS EFFECT IN THE SHORT-TERM; AND
- THE EFFECT OF THESE RECENT DEVELOPMENTS ON THE OUTLOOK FOR THE OIL MARKET FOR THE REMAINDER OF THIS DECADE.

THE WORLD OIL MARKET HAS BEEN EXTREMELY WEAK IN 1982. SPOT PRICES FOR A BROAD RANGE OF CRUDE OILS HAVE DROPPED PRECIPITOUSLY SINCE MID-JANUARY WITH MOST SPOT PRICES RUNNING $4-5 PER BARREL BELOW CONTRACT PRICES. THERE ALSO HAS BEEN AN EROSION IN OFFICIAL SALES PRICES (OSP) WITH THE AVERAGE OSP OF INTERNATIONALLY TRADED OIL FALLING FROM $34.18 ON JANUARY 1, 1982, TO $33.34 IN THE FIRST WEEK OF APRIL.

MANY OPEC MEMBERS HAVE FELT THE PINCH AS SALES HAVE TUMBLED. OPEC REVENUES, WHICH DECLINED FROM 265 BILLION IN 1980 TO AN ESTIMATED 245 BILLION IN 1981, ARE BEING FURTHER ERODED. IN AN EFFORT TO BOOST SALES SOME MEMBERS ARE SELLING THEIR OIL AT OFFICIAL DISCOUNTS WHILE OTHERS ARE SELLING OIL AT UNOFFICIAL DISCOUNTS THROUGH PROCESSING CONTRACTS WITH REFINERS OR OTHER ARRANGEMENTS. WE HAVE HEARD ESTIMATES THAT 15-20 PERCENT OF OPEC OIL IS CURRENTLY BEING SOLD UNDER SOME FORM OF DISCOUNT.

THE MAIN REASONS FOR THE CURRENT WEAK OIL MARKET ARE:

- RAPIDLY DECLINING WORLD OIL CONSUMPTION DUE TO POOR ECONOMIC PERFORMANCE IN THE INDUSTRIALIZED COUNTRIES AND STRUCTURAL ADJUSTMENTS IN WORLD OIL DEMAND RESULTING FROM THE PRICE SHOCKS OF 1973/74 AND 1979/80;

- THE EXISTENCE OF 7-8 MILLION BARRELS PER DAY (MMBD) EXCESS PRODUCTION CAPACITY WORLDWIDE;

- INVENTORY LIQUIDATION MOTIVATED BY THE HIGH COST OF CARRYING INVENTORIES AND THE DECLINE OF OPERATIONAL REQUIREMENTS;

- ATTEMPTS BY SOME OPEC MEMBERS TO INCREASE MARKET SHARES IN THE FACE OF DECLINING CONSUMPTION AND HEIGHTENED COMPETITION FROM NON-OPEC OIL SUPPLIES; AND

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- A MARKET PSYCHOLOGY WHERE THE PERCEPTION OF FALLING PRICES AND OVERSUPPLY HAS HELPED TO CREATE A SELF-FULFILLING PROPHECY.

A COMBINATION OF FACTORS INCLUDING THE PRICE INCREASES OF 1973/74 AND 1979/80 AND THE RELATIVELY LACK-LUSTER ECONOMIC PERFORMANCE OF THE INDUSTRIALIZED COUNTRIES HAVE HAD A STRONG DEPRESSING EFFECT ON WORLD OIL CONSUMPTION. SINCE 1979 OIL CONSUMPTION HAS DECLINED SOME 5.3 MMBD, FROM 52.4 MMBD TO 47.1 MMBD LAST YEAR. IN THE ABSENCE OF THESE FACTORS OIL CONSUMPTION COULD HAVE BEEN EXPECTED TO CONTINUE THE 1976-1979 GROWTH RATE OF ABOUT 3.0 PERCENT PER YEAR, REACHING 55.6 MMBD IN 1981. LOOKED AT IN THIS WAY, OIL CONSUMPTION WAS ABOUT 8.5 MMBD LESS IN 1981 THAN COULD HAVE BEEN EXPECTED FROM HISTORICAL TRENDS.

ECONOMIC GROWTH AND INDUSTRIAL PRODUCTION CONTINUED TO LAG BEHIND EXPECTATIONS IN LATE 1981 AND EARLY 1982. ECONOMIC RECOVERY IS NOT EXPECTED UNTIL THE SECOND HALF OF 1982 AND AS A RESULT OIL CONSUMPTION WILL REMAIN DEPRESSED IN THE COMING MONTHS.

EVEN WHEN THE ECONOMIES OF INDUSTRIALIZED COUNTRIES DO TAKE AN UPTURN, THE INCREASED ECONOMIC ACTIVITY IS NOT LIKELY TO CREATE ENOUGH ADDITIONAL DEMAND ON WORLD OIL SUPPLIES TO DO MORE THAN ARREST THE DECLINE IN WORLD OIL

CONSUMPTION. THIS IS LARGELY DUE TO THE FACT THAT OIL CONSUMERS AND INVESTORS RESPONDED TO THE PRICE SHOCKS OF 1973/74 AND 1979/80 BY INCREASING ENERGY EFFICIENCY AND SUBSTITUTING OTHER FUELS FOR OIL. THESE STRUCTURAL CHANGES IN THE USE OF ENERGY IN INDUSTRIALIZED COUNTRIES HAVE PLAYED AN IMPORTANT ROLE DURING THE 1980/82 OIL MARKET AND WILL CONTINUE TO OVER THE LONG-TERM.

ANOTHER FACTOR WHICH HAS BEEN IMPORTANT IN DEPRESSING OIL PRODUCTION AND PRECIPITATING THE STEEP DECLINE IN OIL PRICES HAS BEEN ACCELERATED INVENTORY LIQUIDATION DURING THE WINTER 1981/82. IN THE WAKE OF THE SUPPLY DISRUPTIONS BROUGHT ON BY THE IRANIAN REVOLUTION, COMPANIES AND GOVERNMENTS SCRAMBLED TO BUILD INVENTORIES TO RECORD LEVELS AS INSURANCE AGAINST MARKET UNCERTAINTIES. THE ADDITIONAL OIL INVENTORY ACCUMULATED AMOUNTED TO SOME 500-600 MMB WORLDWIDE. AS CONSUMPTION BEGAN TO SLIDE IN RESPONSE TO HIGHER PRICES AND THE ECONOMIC DOWNTURN, COMPANIES FOUND THEMSELVES WITH MORE INVENTORIES THAN THEY NEEDED OR WERE ECONOMIC TO HOLD. IN ADDITION TO THE DECLINE IN OIL CONSUMPTION, INCREASED EXCESS PRODUCTIVE CAPACITY AND HEIGHTENED CERTAINTY ABOUT THE AVAILABILITY AND ADEQUACY OF OIL SUPPLIES PROVIDED FURTHER IMPETUS FOR COMPANIES TO REDUCE INVENTORIES, ESPECIALLY GIVEN THE HIGH COST OF CARRYING EXCESS INVENTORIES AND THE PROSPECT OF A DECLINING REAL PRICE OF OIL.

WHILE CONSUMPTION HAS BEEN FALLING THE AVAILABILITY OF OIL SUPPLIES FROM NON-OPEC SOURCES, PRIMARILY THE NORTH SEA AND MEXICO, HAS BEEN RISING. IN THE PERIOD 1979 TO 1981 NON-OPEC PRODUCTION INCREASED FROM 20.7 MMBD TO 22.0 MMBD. IN 1982 THIS SHOULD RISE TO ABOUT 22.7 MMBD. THIS TREND HAS REDUCED OPEC MARKET SHARES WITH A COMMENSURATE EFFECT ON OPEC PRODUCTION. ITS EFFECT HAS BEEN PARTICULARLY ACUTE FOR OPEC THIS WINTER AS PLUMMETING CONSUMPTION AND LARGE INVENTORY LIQUIDATION HAS PLACED ADDED PRESSURE ON OPEC PRODUCTION LEVELS. AS A RESULT, OPEC CRUDE OIL PRODUCTION HAS DROPPED TO ABOUT 18.5-19.0 MMBD IN MARCH OF THIS YEAR. THIS IS 6-6.5 MMB/D LOWER THAN OPEC PRODUCTION IN MARCH 1981. SEVERAL OPEC MEMBERS WHO HAVE HAD SUBSTANTIAL LOSSES OF MARKET SHARES HAVE RESPONDED BY MARKETING CRUDE MORE AGGRESSIVELY. IRAN, IRAQ AND LIBYA HAVE DISCOUNTED THEIR PRICES OFFICIALLY AND UNOFFICIALLY WHICH HAS SERVED TO FURTHER WEAKEN SPOT MARKETS. NIGERIA, WHOSE LIGHT CRUDE IS PRICED AT $35.50, HAS BEEN UNDER INTENSE PRESSURE, ESPECIALLY SINCE THE PRICE OF COMPETITIVE CRUDES FROM THE NORTH SEA WERE SLASHED TO $31.00 PER BARREL. BUYERS HAVE OPTED NOT TO LIFT NIGERIAN CRUDE AND PRODUCTION HAS DROPPED FROM A LEVEL OF 1.8 MMBD IN JANUARY TO APPROXIMATELY .9 MMBD IN MARCH.

CURRENT MARKET TRENDS HAVE PUT INTENSE PRESSURE ON THE OPEC BENCHMARK OF $34 PER BARREL. MOST NON-OPEC OIL EXPORTERS

HAVE CHOSEN THE STRATEGY OF ALLOWING PRICES TO FALL IN ORDER TO KEEP OIL SALES UP. CONTRACT OIL PRICES IN NON-OPEC PRODUCERS HAVE FALLEN FROM $3.00-3.50 BELOW THE OPEC PRICE SINCE JANUARY. OPEC, ON THE OTHER HAND, RESPONDED TO THESE MARKET PRESSURES BY DECIDING TO MAINTAIN PRICES AND TO CUT PRODUCTION BY ADOPTING A SYSTEM OF PRODUCTION PRORATIONING AT THEIR EXTRAORDINARY MARCH 19, 1982, MEETING IN VIENNA. THE NEW QUOTA SYSTEM, DESIGNED TO LIMIT OPEC PRODUCTION TO 18.0 MMBD, MARKED THE FIRST TIME IN ITS 21 YEAR HISTORY THAT OPEC HAS BEEN ABLE TO AGREE, AT LEAST IN PRINCIPLE, TO A PRODUCTION PRORATIONING SCHEME. THE QUOTA SYSTEM WENT INTO EFFECT APRIL 1 AND IS SCHEDULED TO BE REVIEWED AT THE NEXT OPEC MEETING IN MAY IN QUITO, ECUADOR.

THE SAUDI PRODUCTION CEILING UNDER THIS SCHEME CONTINUES TO BE 7.5 MMBD SINCE THE SAUDIS MAINTAIN THAT THEIR PRODUCTION LEVEL IS A SOVEREIGN ISSUE, ALTHOUGH THEY HAVE VOLUNTARILY REDUCED THEIR PRODUCTION CEILING BY .5 MMBD TO 7.0 MMBD IN APRIL. THIS MADE THE APRIL PRODUCTION CEILING 17.5 MMBD.

THE MARKET IMPACT OF THE RECENT OPEC DECISION TO CUT CRUDE OIL PRODUCTION TO 17.5 MMBD BEGINNING APRIL 1, 1982, WILL DEPEND PRIMARILY ON THE EVOLUTION OF WORLD OIL CONSUMPTION FOR THE REMAINDER OF THE YEAR, THE CURRENT LEVEL OF SURPLUS COMMERCIAL INVENTORIES, AND, PERHAPS MOST IMPORTANT, THE ABILITY OF OPEC TO MAINTAIN THE NEW, LOWER PRODUCTION LEVELS FOR A SUFFICIENT PERIOD OF TIME. WITH REGARD TO THIS LAST POINT, SAUDI ARABIA'S WILLINGNESS TO CUT PRODUCTION FURTHER WILL REMAIN A DOMINANT FACTOR IN THE EVOLUTION OF THE MARKET IN THE SHORT-TERM. SAUDI ARABIA'S DECISIONS ABOUT FUTURE PRODUCTION CUTS ARE LIKELY TO BE BASED ON THEIR NEEDS FOR INCOME, MINIMUM TECHNICAL PRODUCTION LEVELS NECESSARY TO MAINTAIN THEIR DOMESTIC NATURAL GAS SYSTEM, THEIR DESIRE TO MAINTAIN MARKET SHARES, THEIR PERCEPTIONS OF MARKET CONDITIONS AND THEIR DETERMINATION TO MAINTAIN THEIR CURRENT LEVEL OF INFLUENCE WITHIN OPEC.

IN ANY EVENT, THE RECENT OPEC DECISION TO CUT PRODUCTION IS UNLIKELY TO HAVE A SIGNIFICANT SHORT-TERM IMPACT ON THE MARKET. IT IS QUITE POSSIBLE THAT WEAK MARKET CONDITIONS WILL FORCE OPEC TO REDUCE PRODUCTION BY ANOTHER 0.5-1.0 MMBD TO STEM THE SLIDE IN OIL PRICES. AS LONG AS COMPANIES CONTINUE TO WORK OFF EXCESS COMMERCIAL INVENTORIES THE APRIL 1 CUT IS, AT BEST, ONLY LIKELY TO ARREST THE DECLINE IN SPOT CRUDE OIL PRICES. UNDER CURRENT MARKET CONDITIONS THE OPEC DECISION TO CUT PRODUCTION TO 17.5 MMBD IS PROBABLY MORE IMPORTANT AS A MEANS TO INFLUENCE MARKET PSYCHOLOGY THAN AS A MEANS TO REDRESS THE ACTUAL IMBALANCE BETWEEN DEMAND AND SUPPLY.

ESTIMATES OF THE MAGNITUDE OF THE INVENTORY SURPLUS VARY WIDELY, USUALLY IN THE RANGE OF 300-600 MILLION BARRELS AS OF APRIL 1, 1982. WITH NON-COMMUNIST OIL CONSUMPTION EXPECTED TO BE FROM 3.0-3.5 PERCENT BELOW LAST YEAR, OPEC MIGHT HAVE TO SUSTAIN THE NEW PRODUCTION CEILINGS THROUGH THE SUMMER AND POSSIBLY INTO THE FALL. SHOULD CONSUMPTION TURN OUT TO BE LOWER, OR OPEC PRODUCTION HIGHER BECAUSE OF NONCOMPLIANCE WITH PRODUCTION CEILINGS, IT COULD TAKE UNTIL THE END OF THE YEAR, OR LATER, FOR THE SURPLUS TO DISAPPEAR. IN EITHER CASE, IT WOULD APPEAR THAT MAINTENANCE OF THE NEW RELATIVELY LOW PRODUCTION LEVELS MAY BE EXTREMELY DIFFICULT TO ACHIEVE GIVEN THE DIVERSE FINANCIAL NEEDS AND RESOURCES OF INDIVIDUAL OPEC MEMBERS. THE LONGER THE NEW, LOW PRODUCTION LEVELS REMAIN IN EFFECT, THE GREATER THE INTERNAL STRAINS WITHIN OPEC ARE LIKELY TO BE AND THE GREATER ARE THE CHANCES OF A SIGNIFICANT PRICE BREAK ON THE PART OF SEVERAL OPEC PRODUCERS.

EVEN IF OPEC CAN SUCCESSFULLY MAINTAIN THE NEW PRODUCTION CUTS AND WEATHER THE SHORT-TERM DOWNWARD PRESSURE ON PRICES, IT WILL STILL BE FACED WITH THE EVEN GREATER TASK OF ALLOCATING PRODUCTION IN 1983 AND OVER THE MEDIUM-TERM WHEN THE PRESSURES OF REVENUE REQUIREMENTS AND THE POSSIBLE NEED TO ACCOMODATE RISING PRODUCTION FROM THE NORTH SEA, MEXICO, IRAN, IRAQ AND LIBYA WILL MOUNT. CURRENT SPARE PRODUCTIVE

CAPACITY WITHIN OPEC, OVER AND ABOVE THE NEW PRODUCTION CEILINGS, AMOUNTS TO AN ESTIMATED 7.0 MMBD. THIS COULD QUICKLY RISE TO 10 MMBD IF THE FIGHTING BETWEEN IRAN AND IRAQ WERE RESOLVED. WITH WORLD DEMAND FOR OPEC OIL EXPECTED TO RISE, AT MOST, BY ONLY 3.0 MMBD FROM 1982'S DEPRESSED LEVEL, CONSIDERABLE STRAINS ARE LIKELY TO APPEAR FROM ANY OPEC ATTEMPT TO CONTINUE TO RATION PRODUCTION AND SUPPORT PRICE.

GIVEN THE AMOUNT OF SURPLUS PRODUCTIVE CAPACITY IN THE WORLD AND THE CONTINUED DECLINE IN OIL CONSUMPTION, THERE WOULD APPEAR TO BE LITTLE, EXCEPT FOR A MAJOR INTERRUPTION IN A MAJOR SUPPLIER, WHICH IS LIKELY TO APPRECIABLY REVERSE THE CURRENT SITUATION FOR THE NEXT 3-6 MONTHS. ON BALANCE, THINGS ARE MORE LIKELY TO GET WORSE FOR OPEC THAN BETTER DURING THIS PERIOD. FOR THE REMAINDER OF 1982 AND 1983 THE MAJOR UNCERTAINTIES ARE THE EFFECT OF THE EXPECTED ECONOMIC UPTURN ON OIL CONSUMPTION, UNRESOLVED POLITICAL TENSIONS WHICH COULD INTERRUPT THE FLOW OF OPEC OIL EXPORTS, OIL COMPANY INVENTORY POLICIES, AND THE COURSE OF THE WAR BETWEEN IRAN AND IRAQ. UNFAVORABLE DEVELOPMENTS COULD PUSH THE WORLD BACK INTO A TIGHTER OIL MARKET, ALTHOUGH THE CURRENT WEAKNESS IN THE MARKET PROBABLY PUTS THE U.S. AND OTHER OIL IMPORTERS IN A MUCH BETTER POSITION THAN WE HAVE EXPERIENCED IN A LONG TIME TO ABSORB SUCH DEVELOPMENTS WITHOUT THE RAPID PRICE ESCALATION OF 1973/74 AND 1979/80.

FOR THE REST OF THIS DECADE, CONDITIONS IN THE WORLD OIL MARKET WILL CONTINUE TO BE DOMINATED BY ON-GOING STRUCTURAL ADJUSTMENTS TO PAST OIL AND OTHER ENERGY PRICE INCREASES, AND BY THE UNCERTAIN STABILITY OF THE MAJOR OIL-PRODUCING COUNTRIES IN THE PERSIAN GULF REGION. ASSUMING CURRENT OIL PRICES CONTINUE, OIL DEMAND IN THE INDUSTRIALIZED COUNTRIES IS EXPECTED TO REMAIN RELATIVELY FLAT BETWEEN 1983 AND 1985, AND TO DECLINE SLIGHTLY THEREAFTER TO 1990. THIS OVERALL TREND IN THE INDUSTRIALIZED COUNTRIES' OIL DEMAND, HOWEVER, IS LIKELY TO BE MORE THAN OFFSET BY RISING OIL DEMANDS WITHIN OPEC AND NON-OPEC DEVELOPING COUNTRIES.

DECLINING OIL PRODUCTION IN THE INDUSTRIALIZED COUNTRIES AND THE EXPECTED SHIFT IN THE CENTRALLY-PLANNED ECONOMIES FROM NET OIL EXPORTERS TO NET OIL IMPORTERS ARE LIKELY TO LIMIT INCREASES IN NON-OPEC SUPPLIES ESPECIALLY IN THE PERIOD AFTER 1985.

IN THE ABSENCE OF AN UNEXPECTED SUPPLY DISRUPTION, A GRADUAL FIRMING OF THE OIL MARKET IN THE PERIOD TO THE LATE 1980'S WILL PROBABLY ALLOW AND SUPPORT ONLY A MODEST INCREASE IN REAL OIL PRICES. IN SPITE OF THIS RELATIVELY OPTIMISTIC OUTLOOK, HOWEVER, THE OVERALL OIL MARKET SITUATION AND OUTLOOK WILL CONTINUE TO BE DOMINATED BY RISK, UNCERTAINTY, AND THE PERSISTENT THREAT OF UNEXPECTED SUPPLY DISRUPTIONS. THE CURRENT FAVORABLE MARKET CANNOT HIDE THE FACTS THAT OIL

IS A FINITE RESOURCE HEAVILY CONCENTRATED IN RELATIVELY FEW COUNTRIES, SOME OF WHICH ARE LOCATED IN UNSTABLE REGIONS OF THE WORLD. NOR DOES IT ALTER THE FACT THAT ONE COUNTRY, SAUDI ARABIA, PRODUCES ABOUT 40 PERCENT OF OPEC OIL AND SUPPLIES FROM 20-25 PERCENT OF THE OIL TRADED INTERNATIONALLY.

FURTHERMORE, THE PROBABLE PATH OF WORLD OIL PRICES REMAINS HIGHLY UNCERTAIN. THE LONGER THE CURRENT SO-CALLED "GLUT" OR OVERSUPPLY IN THE WORLD OIL MARKET PERSISTS IN THE EARLY PART OF THE DECADE, THE HIGHER GLOBAL DEMAND IS EXPECTED TO BE LATER IN THE DECADE. THIS MIGHT RESULT IN SUBSTANTIAL UPWARD PRICE PRESSURE. IN THE MEANTIME THE PERCEPTIONS OF OIL COMPANY OFFICIALS, TRADERS AND END USE BUYERS WILL GREATLY INFLUENCE THE MARKET ON A DAY TO DAY BASIS. IF WORLD CONDITIONS REMAIN STABLE, OIL MARKETS ARE LIKELY TO CONTINUE TO SLIDE OR REMAIN IN EQUILIBRIUM. THE PERCEPTION OF A SUPPLY INTERRUPTION WHETHER BY WAR, EMBARGO OR NATURAL DISASTER COULD RAPIDLY REVERSE THE CURRENT MARKET PSYCHOLOGY AND TRIGGER ANOTHER DRAMATIC UPTURN IN PRICES, INVENTORY BUILDING, AND POSSIBLE SHORT-TERM SHORTAGES.

WE MUST BE PREPARED TO MEET SUCH EVENTUALITIES BY CAREFULLY FOLLOWING THE OIL TRADE IN NORMAL TIMES AS WELL AS DURING A SUPPLY INTERRUPTION AND PROVIDING THE EXECUTIVE BRANCH, CONGRESS, THE BUSINESS COMMUNITY AND THE AMERICAN PUBLIC WITH ACCURATE INFORMATION IN ORDER TO PREVENT PANIC BUYING AND UNNECESSARY UPWARD PRICE AND SUPPLY PRESSURES.

FREE WORLD OIL DEMAND, 1979 to 1983
(MMB/D)

	1979 Average	1980 Average	1981 Average	1982 Average	1983 Average
Consumption					
United States 1/	18.5	17.1	16.0	15.3	15.4
U.S. Territories	0.4	0.4	0.3	0.3	0.3
Western Europe	14.8	13.5	12.5	11.9	12.0
Japan	5.5	5.0	4.7	4.5	4.5
Other IEA 2/	2.7	2.6	2.4	2.4	2.4
Subtotal IEA	39.1	35.8	33.6	32.4	32.6
Subtotal OECD	41.8	38.5	35.9	34.4	34.6
Other Developed Countries 3/	0.4	0.4	0.4	0.4	0.4
OPEC	2.5	2.7	2.8	2.9	3.1
Non-OPEC LDCs	7.5	7.7	7.8	7.9	8.1
Offshore Military and Other	+0.2	0.2	0.2	0.2	0.2
Total	52.4	49.5	47.1	45.8	46.4
Inventory Change	+0.7	+0.6	-0.7	-2.2	+0.5
Total Supply	53.5	50.1	46.4	43.6	46.9
End of Period Inventory (million barrels)	5,150	5,354	5,120	4,345	4,530

1/ Including processing gain.
2/ Canada, Australia, and New Zealand.
3/ Israel and South Africa.

OMA/IA
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FREE WORLD OIL SUPPLY, 1979 to 1983
(MMB/D)

	1979 Average	1980 Average	1981 Average	1982 Average	1983 Average
Non-OPEC 1/					
United States 2/	10.7	10.8	10.7	10.6	10.5
Canada	1.8	1.8	1.6	1.5	1.6
North Sea	2.1	2.2	2.4	2.6	2.7
Other Developed Countries	0.9	0.8	0.9	0.9	0.9
Mexico	1.6	2.1	2.6	2.9	3.2
Other LDCs	3.6	3.6	3.7	3.9	4.0
Subtotal	20.7	21.3	21.8	22.4	22.9
OPEC					
Algeria	1.2	1.0	0.8	0.7	
Ecuador	0.2	0.2	0.2	0.2	
Gabon	0.2	0.2	0.2	0.2	
Indonesia	1.6	1.6	1.6	1.5	
Iran	3.2	1.5	1.3	1.5	
Iraq	3.5	2.6	1.0	1.0	
Kuwait	2.2	1.4	0.9	0.8	
Libya	2.1	1.8	1.1	0.9	
Neutral Zone	0.6	0.5	0.4	0.3	
Nigeria	2.3	2.1	1.4	1.5	
Qatar	0.5	0.5	0.4	0.4	
Saudi Arabia	9.2	9.6	9.6	7.4	
United Arab Emirates	1.8	1.7	1.5	1.2	
Venezuela	2.4	2.2	2.1	1.7	
NGLs	0.8	0.9	0.9	1.0	
Subtotal	31.7	27.8	23.6	20.3	23.3
Net CPE Exports	1.1	1.0	1.0	0.9	0.7
Total Supply	53.5	50.1	46.4	43.6	46.9

1/ Including natural gas liquids (NGLs).
2/ Including processing gain.

OMA/IA
4-15-81

1980 FREE WORLD OIL DEMAND
(MMB/D)

	1979 Average	1980 1st Q	1980 2nd Q	1980 3rd Q	1980 4th Q	1980 Average
Consumption						
United States 1/	18.5	18.3	16.4	16.1	17.3	17.1
U.S. Territories	0.4	0.3	0.3	0.4	0.4	0.4
Western Europe	14.8	14.9	12.9	12.5	13.8	13.5
Japan	5.5	5.8	4.6	4.4	5.1	5.0
Other IEA 2/	2.7	2.7	2.5	2.5	2.7	2.6
Subtotal IEA	39.1	39.2	34.4	33.9	36.6	35.8
Subtotal OECD	41.8	42.1	36.7	36.0	39.3	38.5
Other Developed Countries 3/	0.4	0.4	0.4	0.4	0.4	0.4
OPEC	2.5	2.7	2.7	2.7	2.6	2.7
Non-OPEC LDCs	7.5	7.7	7.9	7.9	7.8	7.7
Offshore Military and other	+0.2	0.1	0.1	0.1	0.1	0.2
Total	52.4	53.0	47.8	47.1	50.2	49.5
Inventory Change	+0.7	-0.4	+2.9	+2.6	-2.8	+0.6
Total Supply	53.5	52.6	50.7	49.7	47.4	50.1
End of Period Inventory (million barrels)	5,150	5,110	5,370	5,615	5,354	5,354

1/ Including processing gain.
2/ Canada, Australia, and New Zealand.
3/ Israel and South Africa.

OMA/IA
5-15-81

1980 FREE WORLD OIL SUPPLY
(MMB/D)

	1979	1980				1980
	Average	1st Q	2nd Q	3rd Q	4th Q	Average
Non-OPEC 1/						
United States 2/	10.7	11.0	10.8	10.7	10.7	10.8
Canada	1.8	1.8	1.8	1.8	1.7	1.8
North Sea	2.1	2.3	2.2	2.1	2.3	2.2
Other Developed Countries	0.9	0.7	0.8	0.8	0.8	0.8
Mexico	1.6	1.9	2.1	2.2	2.2	2.1
Other LDCs	3.6	3.5	3.7	3.6	3.7	3.6
Subtotal	20.7	21.2	21.4	21.2	21.4	21.3
OPEC						
Algeria	1.2	1.2	1.0	0.9	1.0	1.0
Ecuador	0.2	0.2	0.2	0.2	0.2	0.2
Gabon	0.2	0.2	0.2	0.2	0.2	0.2
Indonesia	1.6	1.6	1.6	1.6	1.6	1.6
Iran	3.2	2.3	1.5	1.5	0.9	1.5
Iraq	3.5	3.5	3.5	3.2	0.3	2.6
Kuwait	2.2	1.9	1.3	1.1	1.3	1.4
Libya	2.1	2.1	1.7	1.7	1.7	1.8
Neutral Zone	0.6	0.6	0.5	0.5	0.5	0.5
Nigeria	2.3	2.2	2.2	1.9	2.0	2.1
Qatar	0.5	0.5	0.5	0.5	0.5	0.5
Saudi Arabia	9.2	9.5	9.5	9.5	10.0	9.6
United Arab Emirates	1.8	1.7	1.7	1.7	1.7	1.7
Venezuela	2.4	2.2	2.1	2.2	2.3	2.2
NGLs	0.8	0.9	0.9	0.9	0.9	0.9
Subtotal	31.7	30.4	28.3	27.5	25.0	27.8
Net CPE Exports	1.1	1.0	1.0	1.0	1.0	1.0
Total Supply	53.5	52.6	50.7	49.7	47.4	50.1

1/ Including natural gas liquids (NGLs).
2/ Including processing gain.

OMA/IA
4-15-81

1981 FREE WORLD OIL DEMAND OUTLOOK
(MMB/D)

Consumption	1980 Average	1981				1981 Average
		1st Q	2nd Q	3rd Q	4th Q	
United States 1/	17.1	17.0	15.5	15.6	16.0	16.0
U.S. Territories	0.4	0.4	0.3	0.3	0.3	0.3
Western Europe	13.5	13.8	11.7	11.7	12.8	12.5
Japan	5.0	5.5	4.2	4.2	4.8	4.7
Other IEA 2/	2.6	2.6	2.4	2.4	2.4	2.4
Subtotal IEA	35.8	36.6	32.3	32.0	33.6	33.6
Subtotal OECD	38.5	39.4	34.2	34.2	36.3	35.9
Other Developed Countries 3/	0.4	0.4	0.4	0.4	0.4	0.4
OPEC	2.7	2.8	2.8	2.7	2.8	2.8
Non-OPEC LDCs	7.7	7.7	7.8	7.8	7.7	7.8
Offshore Military and Other	0.2	0.2	0.2	0.2	0.2	0.2
Total	49.5	50.5	45.4	45.3	47.4	47.1
Inventory Change	+0.6	-1.6	+2.0	-0.6	-2.6	-0.7
Total Supply	50.1	48.9	47.4	44.7	44.8	46.4
End of Period Inventory (million barrels)	5,354	5,205	5,385	5,330	5,120	5,120

1/ Including processing gain.
2/ Canada, Australia, and New Zealand.
3/ Israel and South Africa.

OMA/IA
4-15-81

1981 FREE WORLD OIL SUPPLY PROJECTION
(MMB/D)

	1980 Average	1981				1981 Average
		1st Q	2nd Q	3rd Q	4th Q	
Non OPEC 1/						
United States 2/	10.8	10.7	10.6	10.6	10.8	10.7
Canada	1.8	1.6	1.5	1.6	1.6	1.6
North Sea	2.2	2.4	2.4	2.3	2.4	2.4
Other Developed Countries	0.8	0.9	0.9	0.9	0.9	0.9
Mexico	2.1	2.5	2.8	2.5	2.4	2.6
Other LDCs	3.6	3.7	3.8	3.8	3.7	3.7
Subtotal	21.3	21.8	21.9	21.7	21.8	21.8
OPEC						
Algeria	1.0	1.0	0.9	0.6	0.7	0.8
Ecuador	0.2	0.2	0.2	0.2	0.2	0.2
Gabon	0.2	0.1	0.1	0.2	0.2	0.2
Indonesia	1.6	1.6	1.6	1.6	1.6	1.6
Iran	1.6	1.7	1.6	1.2	0.9	1.3
Iraq	2.6	0.8	1.0	1.1	1.1	1.0
Kuwait	1.4	1.4	0.9	0.8	0.8	0.9
Libya	1.8	1.6	1.4	0.7	0.9	1.1
Neutral Zone	0.5	0.5	0.3	0.3	0.3	0.4
Nigeria	2.1	1.9	1.4	0.8	1.6	1.4
Qatar	0.5	0.5	0.4	0.3	0.3	0.4
Saudi Arabia	9.6	9.9	10.0	9.7	8.8	9.6
United Arab Emirates	1.7	1.6	1.5	1.5	1.4	1.5
Venezuela	2.2	2.2	2.1	1.0	2.2	2.1
NGLs	0.8	0.9	0.9	0.9	0.9	0.9
Subtotal	27.8	26.0	24.4	22.0	22.0	23.6
Net CPE Exports	1.0	1.0	1.0	1.0	1.0	1.0
Total Supply	50.1	48.9	47.4	44.7	44.8	46.4

1/ Including natural gas liquids (NGLs).
2/ Including processing gain.

OMA/IA
4-15-81

1982 FREE WORLD OIL DEMAND OUTLOOK
(MMB/D)

	1981 Average	1982 1st Q	1982 2nd Q	1982 3rd Q	1982 4th Q	1982 Average
Consumption						
United States 1/	16.0	16.0	14.7	14.9	15.5	15.3
U.S. Territories	0.3	0.3	0.3	0.3	0.3	0.3
Western Europe	12.5	12.8	11.1	11.2	12.5	11.9
Japan	4.7	5.0	4.0	4.1	4.7	4.5
Other IEA 2/	2.4	2.4	2.3	2.4	2.5	2.4
Subtotal IEA	33.6	34.4	30.4	31.0	33.5	32.4
Subtotal OECD	35.9	36.5	32.4	32.9	35.5	34.4
Other Developed Countries 3/	0.4	0.4	0.4	0.4	0.4	0.4
OPEC	2.8	2.9	2.9	2.9	2.9	2.9
Non-OPEC LDC's	7.8	7.8	7.9	7.9	7.9	7.9
Offshore Military and Other	0.2	0.2	0.2	0.2	0.2	0.2
Total	47.1	47.8	43.8	44.3	46.9	45.8
Inventory Change	-0.7	-3.7	-2.2	-0.9	-1.7	-2.2
Total Supply	46.4	44.1	41.6	43.4	45.2	43.6
End of Period Inventory (million barrels)	5,120	4,785	4,585	4,505	4,345	4,345

1/ Including processing gain.
2/ Canada, Australia, and New Zealand.
3/ Israel and South Africa.

OMA/IA
4-15-81

1982 FREE WORLD OIL SUPPLY PROJECTION
(MMB/D)

	1981 Average	1982 1st Q	1982 2nd Q	1982 3rd Q	1982 4th Q	1982 Average
Non OPEC 1/						
United States 2/	10.7	10.7	10.6	10.6	10.6	10.6
Canada	1.6	1.5	1.5	1.5	1.5	1.5
North Sea	2.4	2.5	2.6	2.6	2.7	2.6
Other Developed Countries	0.9	0.9	0.9	0.9	0.9	0.9
Mexico	2.6	2.7	2.9	3.0	3.0	2.9
Other LDCs	3.7	3.9	3.9	3.9	3.9	3.9
Subtotal	21.8	22.2	22.4	22.5	22.6	22.4
OPEC						
Algeria	0.8	0.7	0.7	0.7	0.8	0.7
Ecuador	0.2	0.2	0.2	0.2	0.2	0.2
Gabon	0.2	0.2	0.2	0.2	0.2	0.2
Indonesia	1.6	1.5	1.3	1.5	1.6	1.5
Iran	1.4	1.2	1.5	1.6	1.7	1.5
Iraq	0.9	1.5	0.8	0.8	0.8	1.0
Kuwait	0.9	0.7	0.7	0.8	0.9	0.8
Libya	1.2	0.8	0.8	0.9	1.1	0.9
Neutral Zone	0.4	0.3	0.3	0.3	0.4	0.3
Nigeria	1.4	1.4	1.1	1.5	1.8	1.5
Qatar	0.4	0.4	0.3	0.4	0.4	0.4
Saudi Arabia	9.6	7.9	7.0	7.0	7.5	7.4
United Arab Emirates	1.5	1.4	1.0	1.2	1.4	1.2
Venezuela	2.0	1.8	1.5	1.8	1.9	1.7
NGLs	0.9	1.0	1.0	1.0	1.0	1.0
Subtotal	23.6	21.0	18.3	20.0	21.7	20.3
Net CPE Exports	1.0	0.9	0.9	0.9	0.9	0.9
Total Supply	46.4	44.1	41.6	43.4	45.2	43.6

1/ Including natural gas liquids (NGLs).
2/ Including processing gain.

OMA/IA
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Potential Level of OPEC Oil Exports Under New Production Ceilings

(MMBD)

	New Production Levels	Estimated Internal Consumption 2/	Available for Export 3/
Algeria	0.65	0.13	0.52
Ecuador	0.20	0.08	0.12
Gabon	0.15	0.01	0.14
Indonesia	1.30	0.40	0.90
Iran	1.20	0.45	0.75
Iraq	1.20	0.22	0.98
Kuwait 1/	0.80	0.15	0.65
Libya	0.75	0.10	0.65
Nigeria	1.30	0.23	1.07
Qatar	0.30	0.01	0.29
Saudi Arabia 1/	7.15	0.58	6.62
UAE	1.00	0.09	0.91
Venezuela	1.50	0.40	1.10
	17.50	2.80	14.70

1/ Includes Neutral Zone consumption and production shared between Saudi Arabia and Kuwait.

WORLD PETROLEUM

Petroleum Consumption and Net Imports 1/ Major Free World Industrialized Countries -Thous. B/D

	1973	1979	1980	1981
United States				
Consumption	17,308	18,513	17,056	16,001
Imports (Net)	6,025	7,985	6,365	5,387
Percent	34.8	43.1	37.3	33.7
Canada				
Consumption	1,820	1,940	1,890	1,795
Imports (Net)	(260)	170	195	240
Percent	-	8.8	10.3	13.4
United Kingdom				
Consumption	2,340	1,960	1,670	1,570
Imports (Net)	2,330	390	19	(412)
Percent	99.6	19.9	1.1	-
France				
Consumption	2,700	2,470	2,310	2,075
Imports (Net)	2,680	2,500	2,310	1,980
Percent	99.3	101.2	100.0	95.4
Germany				
Consumption	3,120	3,010	2,630	2,410
Imports (Net)	3,020	3,005	2,625	2,265
Percent	96.8	99.8	99.8	94.0
Italy				
Consumption	2,080	2,045	1,955	1,900
Imports (Net)	2,095	2,000	1,925	1,930
Percent	100.7	97.8	98.5	101.6
Japan				
Consumption	5,385	5,510	5,015	4,735
Imports (Net)	5,570	5,630	5,110	4,550
Percent	103.4	102.2	101.9	96.1
Other OECD 2/				
Consumption	5,450	6,400	6,020	5,710
Imports (Net)	4,900	5,430	5,085	4,550
Percent	89.9	84.8	84.5	79.7
Total OECD				
Consumption	40,203	41,848	38,546	36,196
Imports (Net)	26,360	27,110	23,634	20,490
Percent	65.6	64.8	61.3	56.6

1/ Net Imports = Total Imports Less Exports.
2/ Includes U.S. Territories.

Estimated OPEC Production Thus Far in 1982
(MBD)

	1st Q	April
Algeria	700	600
Ecuador	200	200
Gabon	200	150
Indonesia	1,500	1,300
Iran	1,200	1,200-1,800
Iraq	1,500	800
Kuwait	700	600
Libya	800	550-600
Neutral Zone	300	250
Nigeria	1,400	850
Qatar	400	300
Saudi Arabia	7,900	6,500-7,000
UAE	1,400	1,000
Venezuela	1,800	1,500
Total Crude	20,000	15,800-16,950
NGLs	1,000	1,000
Crude + NGLs	21,000	16,800-17,950

Source: U.S. Department of Energy
Office of International Affairs

The CHAIRMAN. Thank you, Mr. Secretary. What is an inventory surplus?

Dr. O'BRIEN. It is really a very tenuous number. At any one time there are inventories which are maintained within companies and end users. It is usually determined by the perception of available supply and the normal operating needs of the particular organization. We try to calculate a number, an aggregate number. It is a very difficult number to really calculate, however, because there are approximately 5 billion barrels, to 5½ billion barrels, which are really measurable. There may be another 5 billion that are in the hands of end users that are not measurable. Generally, the calculation is made on the basis of how many days you need to basically operate.

The CHAIRMAN. You mean a zero carrying capacity, just enough to keep the operation going in the normal resupply; in other words, no standby or no reserve at all?

Dr. O'BRIEN. Well, in the calculations of stocks and inventories, the system needs a certain amount to just simply keep it going, and that is approximately somewhere in the neighborhood of 3.51 to 4 billion barrels, according to industry estimates.

The CHAIRMAN. Are you saying that anything above the current resupply demand of the industry is an inventory surplus?

Dr. O'BRIEN. Yes.

The CHAIRMAN. Is that influenced by the fact that the current psychology of the marketplace indicates there is no danger of resupply, and therefore no need to carry anything beyond just the resupply needs? Assuming that there is adequate supply you don't have to carry any stocks of your own?

Dr. O'BRIEN. Well, it is a judgment basically again which is on the availability of oil. Again, this question of surplus capacity is very critical. It is a judgment based on what you see in terms of the future path of oil prices. It is a judgment based on what it is going to cost to store inventory. There are a number of factors. Again, the whole question of supply security, all of these things enter into that kind of a judgment on the part of a company or other organization that might be maintaining inventories.

I guess the point I would like to make, the calculation which analysts make is a very, very tenuous number, and it is based essentially on what we know about past historical experience, but again, the calculation of this number, the aggregation of this number, is all but precise, and it is an analyst's judgment which is made.

The CHAIRMAN. Anybody who is buying any product, whether it be oil or anything else, has some perception of their own needs which is based upon a complicated number of factors. But if I understand correctly what you are saying, inventory surplus would be measured against a number of factors. For example, if the consumption of an oil product within a given industry were measured in days and they could reliably predict resupply in 7 days, then they would only have 7 days' supply on hand at any one time because they could always bring in the resupply in that length of time; therefore wouldn't anything in excess of that amount be considered surplus inventory?

Dr. O'BRIEN. Right. For example, if you were in a situation and you were perceiving that you were going to have let's say a possibility of a difficulty of obtaining supply, you would obviously want to hedge your bet by essentially obtaining additional oil for your inventory, whether you are a supplier or an end user. If you would perceive essentially that the price was going to increase, if there was a shortage, for example, and there was a tightness in the market, you might anticipate that you are going to recover any costs of storage costs by essentially that price increase which is going to occur, so again, the judgment would be on the basis of how you saw the security of supply, yes, the availability of oil.

Certainly this current surplus of productive capacity cannot help but affect the judgment of anyone whenever they are in the business.

The CHAIRMAN. If a farmer consumes 15,000 gallons of diesel a year, and he can get a resupply once a week, anything in excess of a week's supply would be inventory surplus. If he was concerned about being able to resupply, he might want 15,000 gallons?

Dr. O'BRIEN. Yes; and I will just give you a very close personal kind of observation. I can remember in the spring of 1979 in Anne Arundel County talking to some fuel oil dealers who were indicating that people who ordinarily bought fuel oil in August and September, for the following year, were building inventories as early as April and May with the thought that the price of that fuel oil was going to increase considerably, and it may not be available, so again, depending on what your perception of the market is, I think it is very critical in terms of the kind of judgment that a person in the business makes.

For example, now if you think that oil prices are going to slide, continue sliding, you are not going to make long-term purchases. You are going to buy short. You are going to buy spot, and again, I think this psychology is a very important thing which has to be linked with inventories.

The other thing I think one has to keep in mind is that when you go through the system, this 10, 10½ billion barrels of inventory, half of which we really have some kind of a handle on, is sort of like a giant sponge, and if you have a supply perception that there is going to be a shortage of supply, it is like a sponge. It can soak up a lot of oil very quickly, and I think that was the case certainly in 1979.

On the other hand, if you perceive that there is a lot of oil out there and that it is going to be easy to get, you squeeze the sponge and it comes out, and I think that is basically the behavior that we have seen here in recent months.

The CHAIRMAN. I don't mean to belabor the point, but if that farmer who consumes 15,000 gallons a year had a peak consumption of 1,000 gallons a week at a peak reserve supply for him in periods such as we perceive to have now, the reserve would be a thousand gallons, and if there were uncertainty about supply, the inventory would be 15,000, so you could have a variation of fifteen to one of the surplus inventory.

Dr. O'BRIEN. Precisely, and most important, there is no way that here in Washington or any place else in the world we could measure that farmer's perception of the market.

The CHAIRMAN. What is your expectation of the rate of economic recovery in the United States?

Dr. O'Brien. I would like to turn to our expert on that, John Brodman.

Mr. Brodman. Mr. Chairman, we are energy market analysts primarily, but in producing our forecasts, we do survey what most economists appear to be projecting for economic recovery, and in the forecast Acting Deputy Assistant Secretary O'Brien presented this morning, we do see an economic recovery in the United States occurring in the second half of this year, but perhaps not quite as fast as some would like to see us get on with recovery.

The Chairman. What real growth rates do you have?

Mr. Brodman. For the year 1982 as a whole, we see real economic activity in the United States being down slightly, perhaps flat to minus a half a percentage point, but in 1983 in the forecast we presented, we see real economic growth in the United States of just a little less than 3 percent.

The Chairman. What is OMB's official forecast?

Mr. Brodman. I am not really sure exactly what the Office of Management and Budget's most recent official number is for 1983, but I think it is a bit higher, with economic growth more in the range of above 4 percent perhaps.

The Chairman. Mr. O'Brien, on pages 3 and 4 you indicate that even with economic recovery you don't expect any increased oil consumption. Upon what do you base that statement?

Dr. O'Brien. Well, it is basically, I guess it is a conventional wisdom; also a lot of indicators which we see in terms of just the drop in demand, and also I think some rather significant structural change. I follow very closely, for example, the reports that come out of California from their Energy Commission on activity and energy usage, and one of the interesting numbers I have been following for quite a while is the relationship between the miles driven in automobiles and the consumption of gasoline. The consumption per driver, and miles driven have been increasing and the consumption per automobile has been dropping, and it has been to a point where there has been an absolute drop, and it is very significant.

I looked at some numbers the other day in terms of just Canadian fuel consumption—heating oil consumption down 17 percent in 1981, and when we look at gasoline demand worldwide but particularly in Europe, the gasoline market simply has not come back, so there is a lot of indications I think that we are seeing of very significant cases of substitution of other fuels, of growing efficiency, which is taking place within the system, and again, many of these were spawned by the previous economic shocks which occurred as a result of oil price increases, and they will continue in my judgment.

The Chairman. In California, what has been the pattern of electricity generated with oil?

Dr. O'Brien. I would be more than happy—I would be a little bit uncomfortable quoting that without looking at the numbers. I will submit that to you.

The Chairman. All right.

[The material requested follows:]

Department of Energy
Washington, D.C. 20585

SENATE COMMITTEE
RGY AND NATURAL RESOURCES
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May 6, 1982

Honorable James A. McClure
Chairman, Committee on Energy
and Natural Resources
United States Senate
Washington, D.C. 20510

Dear Mr. Chairman:

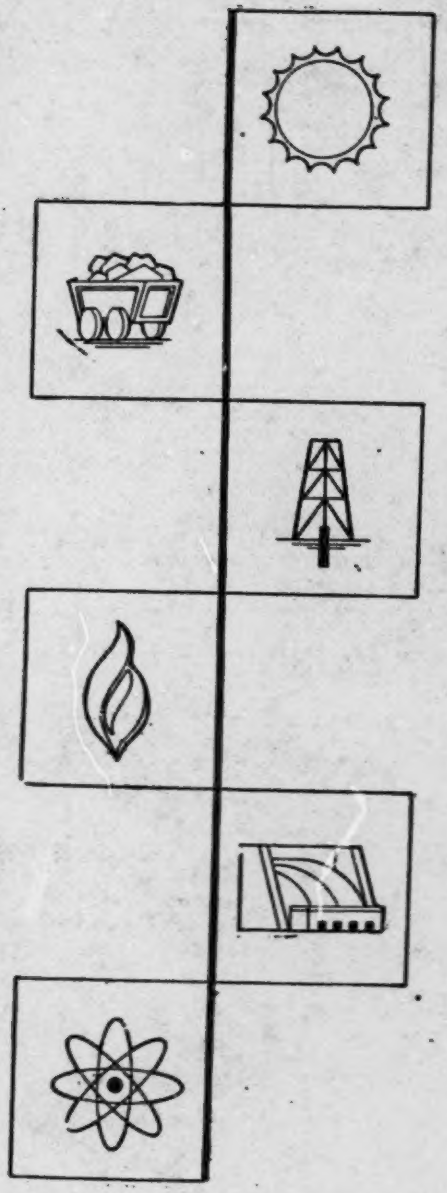
On April 23, 1982, Dennis J. O'Brien, Department of Energy, appeared before the Senate Committee on Energy and Natural Resources concerning the World Petroleum Outlook. During the course of the hearing, you requested certain information which was to be provided for the record. A copy of the Insert for the Record for page 22, line 24, which was also provided directly to the Committee, is enclosed.

If you have any questions, please call Ingrid Nelson or Tom Pretorius of my staff on 252-4277. They will be happy to assist you.

Sincerely,

Thomas H. Pretorius
for Robert G. Rabben
Assistant General Counsel
for Legislation

Enclosure



CALIFORNIA
ENERGY
COMMISSION

ENERGY WATCH

MARCH 1982

ENERGY WATCH

ENERGY WATCH is the California Energy Commission's monthly summary of energy production and use trends in California. Its purpose is to provide a wide audience with the latest available information about California's energy picture. Information for this report is gathered under the authority of Section 25354 of the Public Resources Code.

ENERGY WATCH is grateful for the cooperation of the state's utility and petroleum companies in preparing this report. Special thanks are also extended to the Department of Motor Vehicles, the California Department of Transportation, the State Board of Equalization, and Lundberg Survey, Inc.

To subscribe, write:

Editor
Energy Watch
1111 Howe Avenue, MS 23
Sacramento, CA 95825

Volume 5, Number 3

Electricity

12-Month-Ended Electricity Sales Up for December

Combined electricity sales of the state's five major utilities increased 3.9 percent for the 12-month period ending December 1981 (Figure 1). On an individual basis, Pacific Gas and Electric Company (PG&E) sales increased 4.6 percent; Sacramento Municipal Utility District (SMUD) sales increased 6.4 percent; Southern California Edison (SCE) sales increased 3.4 percent; Los Angeles Department of Water and Power (LADWP) sales increased 3.7 percent; and San Diego Gas and Electric Company (SDG&E) sales increased 1.4 percent.

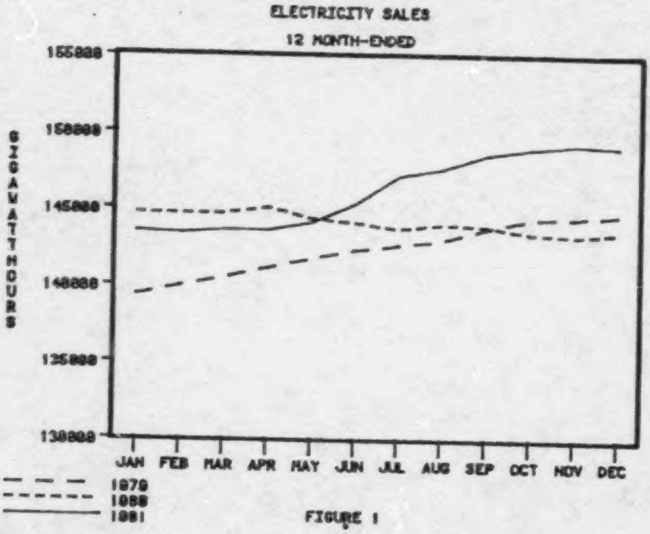


FIGURE 1

The major sources of the 3.9 percent statewide electricity sales growth were:

- PG&E net sales to the Department of Water Resources, up 1.2 million kWh (66.3 percent);
- PG&E industrial sales, up .84 million kWh (6.6 percent);
- SCE commercial sales, up .75 million kWh (5.3 percent);
- PG&E agricultural sales, up .38 million kWh (9.9 percent); and
- SCE agricultural sales, up .15 million kWh (15.7 percent).

Four of these five increases are related to low precipitation in Northern California during the 1980/81 winter. The Department of Water Resources normally supplies considerable hydrogeneration to PG&E, but less was possible in 1981. Several large industrial users in PG&E territory normally purchasing hydroelectricity from the City of San Francisco Hetch Hetchy facility had to purchase from PG&E for the same reason. Agricultural customers were forced to use more electricity for pumping during the unusually dry and hot 1981 summer.

Taken together, the growth elements indicate that the unexpectedly high 3.9 percent increase in electricity sales in 1981 was principally attributable to unusual weather and does not constitute a new higher growth trend. 1982 will be a much better year for hydrogeneration.

December Residential Electricity Consumption Down

Returning to the pattern in evidence earlier in the year, December average residential consumption was down 19 kilowatt-hours from the previous year (Figure 2). SMUD customers used the most electricity, an estimated 769 kilowatt-hours per household, while LADWP customers used the least, 377 kilowatt-hours.

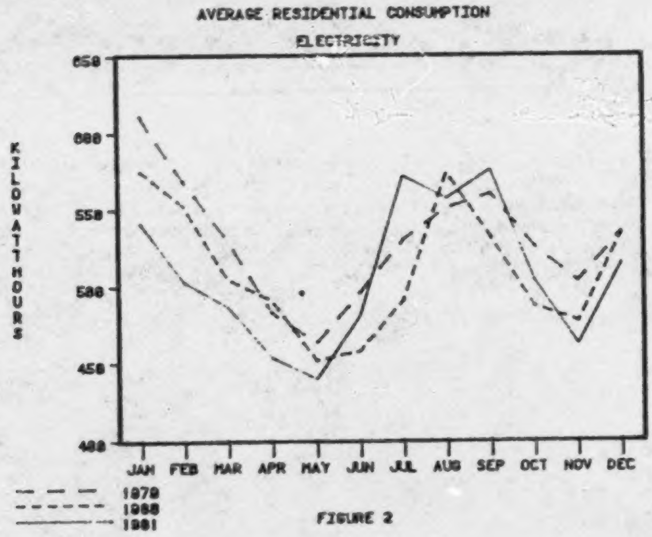


FIGURE 2

Average Residential Electricity Bill Up

Due to rate increases necessary to recover the higher cost of fossil-fueled generation needed during the summer of 1981, the statewide average residential electricity bill in December 1981 was $37.26 for 515 kWh, up 16 percent from last year (Figure 3).

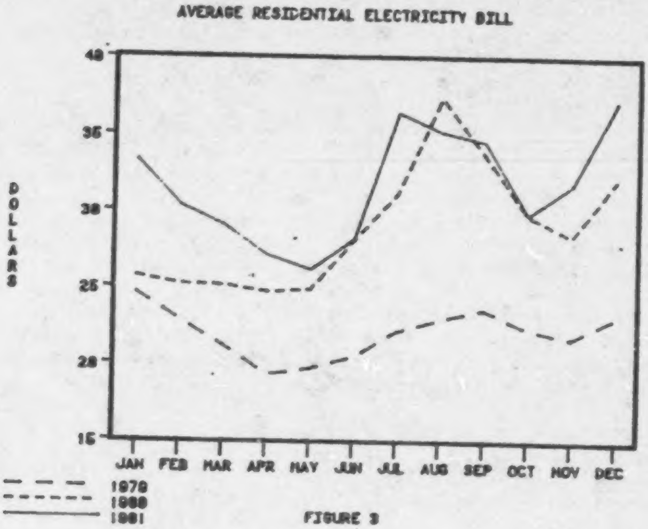


FIGURE 3

Although SDG&E customers have the highest rates in the state, a mild climate permits relatively low energy use and hence lower bills. PG&E customers live in a more extreme climate requiring greater energy use which combines with high rates to produce the highest average bill. SMUD customers also live in a more extreme climate and use the most energy but pay the smallest bill because of the lowest rates.

Cost of Oil and Natural Gas Electricity Generation

Oil and natural gas price increases continue to drive the cost of generating electricity higher. Table 1 shows how oil- and natural gas-fired generation costs have increased between December 1980 and December 1981 in Northern and Southern California. The oil-fired costs shown still reflect purchases made in 1981 when prices reached a peak.

TABLE 1

COST OF FUEL BURNED BY POWER PLANTS
DOLLARS PER MILLION BTU
December

	Oil		Natural Gas		Change	
	1980	1981	1980	1981	Oil	Nat. Gas
PG&E	4.83	6.31	3.77	4.29	+30.6%	+13.8%
LADWP	5.72	6.92	3.33	4.52	+21.0%	+35.7%

Natural Gas

Natural Gas Sales Up

Total natural gas sales were 17.7 billion therms for the 12-month period ending December 1981, 4.7 percent higher than last year (Figure 4). Phased price deregulation between 1978 and the end of 1981 resulted in natural gas becoming cheaper and more plentiful relative to other fuels, and utilities have taken advantage of the lower price and greater availability of this low-polluting fuel. This reduces the need to import oil to burn in power plants. Continued conservation in the residential, commercial, and industrial sectors (Figure 6) has decreased demand and released increasing amounts of natural gas to be used for generating electricity. Power plants burned 1,208 million therms more natural gas than a year ago, up 23.9 percent (Figure 5). In December, residential, commercial, and industrial customers used 404 million therms less than 1 year ago and 1,350 million therms less than 1979.

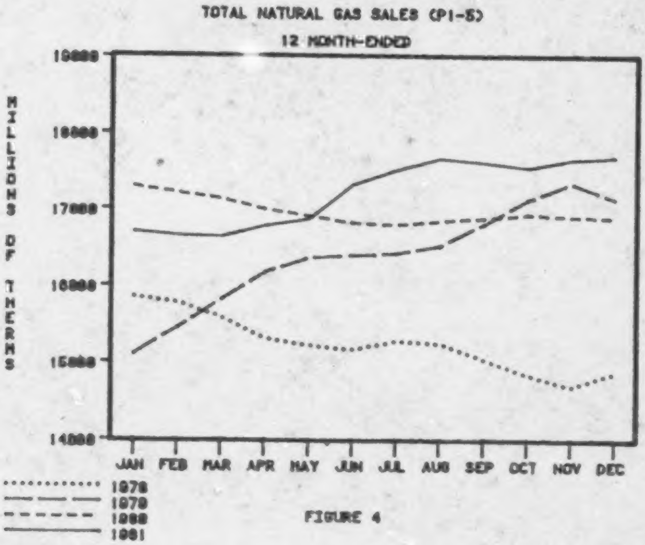


FIGURE 4

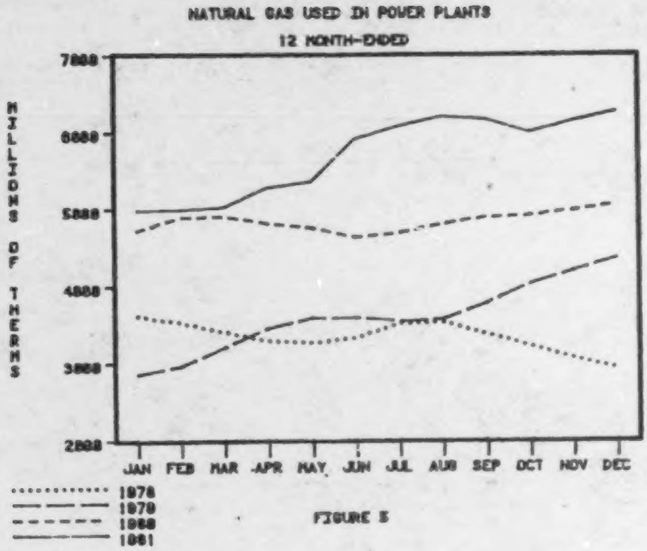

NATURAL GAS USED IN POWER PLANTS
12 MONTH-ENDED

FIGURE 5

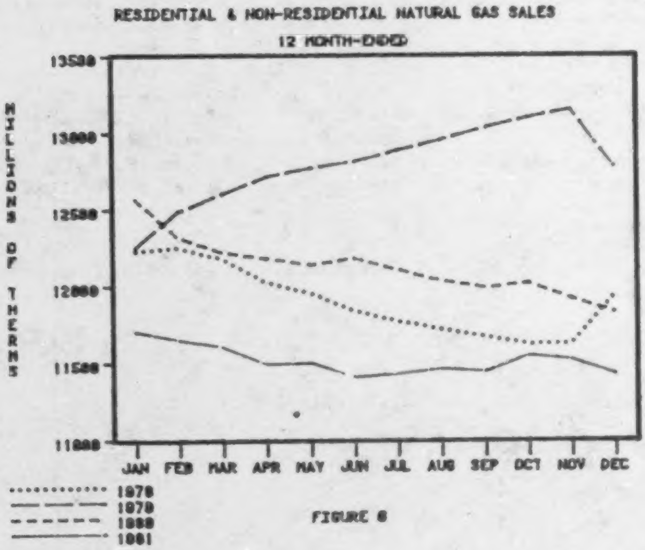

RESIDENTIAL & NON-RESIDENTIAL NATURAL GAS SALES
12 MONTH-ENDED

FIGURE 6

December Residential Consumption

Statewide average household natural gas consumption was 85 therms in December, down 9.6 percent from December 1980 (Figure 7).

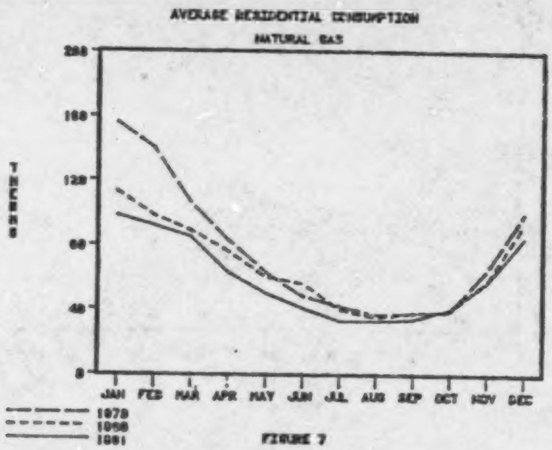


FIGURE 7

Average Residential Natural Gas Bill Down 7.6 Percent

Because of reduced consumption, the statewide average residential natural gas bill in December 1981 was 7.6 percent lower than last year at $29.74, as shown in Figure 8, while the average cost per therm increased 2.3 percent from 34.2 cents to 35.0 cents. Pacific Gas and Electric customers received the highest gas bills because of a cool climate and high rates. SDG&E has the highest rates, but bills are lower because of the moderate climate. PG&E and SoCal customers consumed the most natural gas per household. Long Beach customers received the lowest bills because of low consumption. Natural gas rates do not vary as greatly over the state as electric rates (see Table 2, Statistics section).

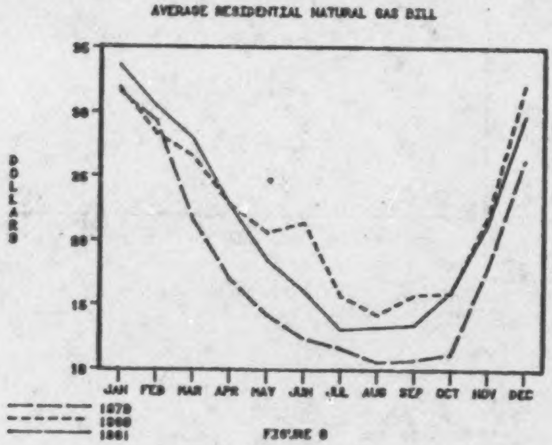


FIGURE 8

Oil and Gasoline

Crude Oil Delivered to Refineries Down 9.9 Million Barrels; Imports Drop 47 Percent

Because of reduced consumption and a drawing down of storage, total crude oil purchased by refineries continues to run behind last year. California refiners bought an estimated 49.5 million barrels of crude oil in December 1981, 16.7 percent less than 1 year ago. Crude oil purchases from domestic sources decreased from 51.1 million barrels in December 1980 to 45.1 million barrels in December 1981. Oil imports are off dramatically; foreign crude delivered to California refiners in December 1981 was estimated at 4.4 million barrels, about half the 8.3 million barrels imported in December 1980.

World Average Crude Oil Plummet

In January 1982, the average price for crude oil on the world market decreased to $34.18 per barrel from December's posted price of $34.38 per barrel. Prices appear ready to drop below the recent October 1981 low of $33.96.

Total Gasoline Consumption for 1981 Decreases

Gasoline consumption in California during 1981 was the lowest in five years. Figures compiled by the Board of Equalization show that Californians consumed 11,075,481,290 gallons of motor gasoline in 1981, compared to 11,171,154,420 gallons consumed in 1980. The total motor fuel consumption for December 1981--958,391,206 gallons--was 5 percent more than in December 1980 and 8 percent more than in November 1981. December is traditionally a high month for fuel consumption due to holiday travel. (Figure 9)

Licensed Drivers and Registered Autos

According to the Department of Motor Vehicles, there were an estimated 15.98 million licensed drivers in California in December 1981, 2 percent more than last year. An estimated 15.3 million registered gasoline-powered automobiles and pickup trucks were on the road December 1981, 1.5 percent more than December 1980.

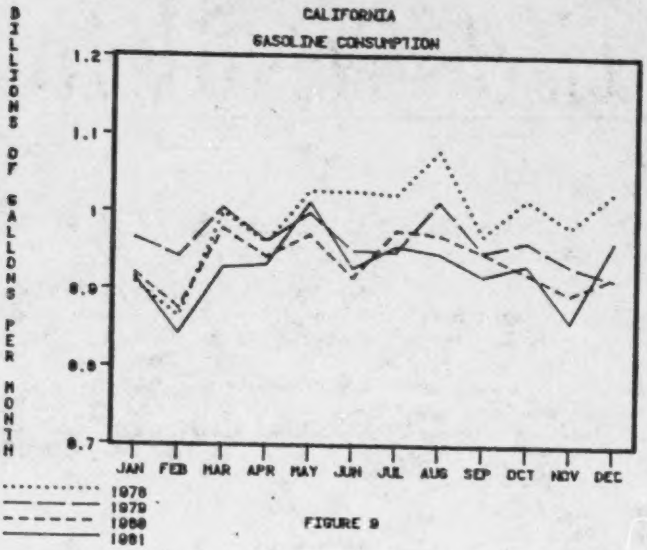


FIGURE 9

Gasoline Consumption per Driver Up

As shown in Figure 10, the typical California driver used 57.9 gallons of gasoline in December 1981 compared to 56.8 and 57.7 gallons per driver in December 1980 and 1979, respectively. This is only the second month in which per driver gasoline consumption was more in 1981 than 1980. Greater holiday travel in December 1981 explains the increase.

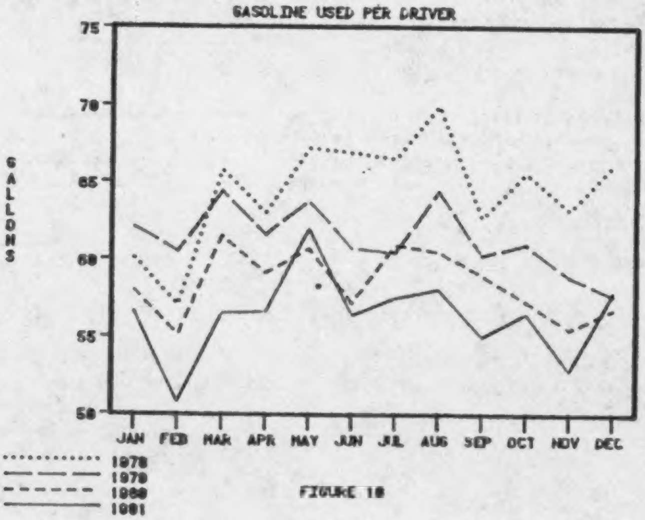


FIGURE 10

Automobile Fuel Prices

Average fuel prices in the state continued to decline in February. Dealer sales margins also narrowed. Table 2 shows average statewide prices and dealer margins for February 4, 1982. The price decline is expected to continue because of reduced worldwide demand and competition among marketers.

TABLE 2

AVERAGE GASOLINE AND DIESEL FUEL PRICES IN CALIFORNIA[1]
(cents/gallon)

	Regular Leaded		Regular Unleaded		Premium Unleaded		Diesel	
	Full	Self	Full	Self	Full	Self	Full	Self
Retail Price	142.0	125.5	147.7	132.3	153.6	145.3	129.2	121.5
Wholesaler to Dealer Price[2]	104.5	102.5	107.7	106.0	113.9	113.5	96.4	96.4
Apparent Margin[3]	18.3	4.8	20.5	7.7	19.8	12.4	-	-

---

1. Source: Lundberg Survey, Inc., survey of state market areas conducted February 4, 1982.

2. Does not include taxes. Includes transportation costs.

3. The difference between retail and wholesale price excluding taxes. Wholesale and retail arrangements in diesel marketing are so variable that calculations of "Apparent Margin" are meaningless.

Transportation

State Highway Travel Up

Travel on state highways in December 1981 was up 4.7 percent over December 1980, as shown in Table 3. Weekend travel was up 2.5 percent over the same period in 1980; weekday travel was up 3.3 percent. However, fuel consumption does not show a commensurate increase. Although we have no data on miles travelled on local streets, the use of less fuel for more miles travelled strongly suggests a rapid transition to smaller more fuel-efficient cars is taking place.

TABLE 3

TRAVEL ON STATE HIGHWAYS
December

Travel	Billion Vehicle Miles			Percent Change	
	1979	1980	1981	79/80	80/81
Travel on Weekends	1.79	1.97	2.02	+10.1	+2.5
Travel on Weekdays	5.32	5.39	5.57	+1.3	+3.3
Total Travel for Month	7.11	7.36	7.59	+3.5	+3.1
Calendar Year*	86.64	87.61	91.72	+1.1	+4.7
12-Month Period*	86.64	87.61	91.72	+1.1	+4.7

State Transit Ridership

Bus patronage in December 1981 decreased 5.6 percent over December 1980, as shown in Table 4. Ridership increased in Northern California +4.6 percent and decreased in Southern California -9.1 percent. Bay Area Rapid Transit (BART) ridership increased 19.4 percent. Total transit ridership decreased 5.6 percent. Transit ridership by company is shown in Table A3 of the Statistics section.

---

*May not add up due to rounding.

TABLE 4

TRANSIT RIDERSHIP (THOUSANDS)
December

Bus Ridership	1979	1980	1981	Percent Change 79/80	Percent Change 80/81
North State[1]	4,738	5,794	6,058	+22.3	+4.6
South State[2]	39,783	43,424	39,481	+9.2	-9.1
Statewide[3]	44,521	49,218	45,539	+10.6	-7.5
BART Ridership					
Total	2,971	3,771	4,503	+26.9	+19.4
TOTAL TRANSIT[3]	47,492	52,989	50,042	+11.6	-5.6

---

1. Excludes AC Transit due to a change in reporting method, see Table A3.

2. Excludes Santa Monica due to a change in reporting method, see Table A3.

3. Excludes AC Transit and Santa Monica.

Statistics

TABLE A1

AVERAGE RESIDENTIAL ELECTRICITY BILL
December

Utility	Dollars		kWh		Average Cost Cents/kWh	
	1980	1981	1980	1981	1980	1981
PG&E	$32.59	$43.79	590	576	5.5	7.6
SMUD	18.99	20.98	781	769	2.4	2.7
SCE	32.58	35.52	509	480	6.4	7.4
LADWP	24.97	24.17	378	377	6.6	6.4
SDG&E	44.98	42.67	487	468	9.2	9.1
Statewide*	32.12	37.26	534	515	6.0	7.2

TABLE A2

AVERAGE RESIDENTIAL NATURAL GAS BILL
December

Utility	Dollars		Therms		Average Cost Cents/Therms	
	1980	1981	1980	1981	1980	1981
PG&E	$37.66	$31.97	104	88	36.2	36.3
SoCal	30.08	30.13	93	88	32.3	34.2
SDG&E	20.11	21.58	62	55	32.4	39.2
Long Beach	19.79	12.21	68	33	29.1	37.0
Statewide*	32.17	29.74	94	85	34.2	35.0

---

*Average weighted by number of customers in service areas.

TABLE A3

TRANSIT RIDERSHIP BY COMPANY
(THOUSANDS)

	December 79	December 80	December 81	% Change 79/80	% Change 80/81
North					
Sam Trans	1,357	1,614	1,767	+18.9	+9.4
Santa Clara	1,960	2,387	2,784	+21.8	+16.6
RT Sacto	1,421	1,793	1,507	+26.2	-16.0
AC Transit	4,536	7,105[1]	7,563[1]	NA	+6.5
TOTAL NORTH[2]	4,738	5,794	6,058	+22.3	+4.6
South					
NCTD (N. San Diego Co)	683	351[3]	549	NA	NA
Santa Monica Transit	1,256	1,755[1]	1,666[1]	NA	-5.1
Long Beach Transit	1,427	1,431	1,525	+0.3	+6.5
San Diego Transit	2,244	2,183	1,674	-2.7	-23.3
OCTD (Orange Co)	2,029	2,459	2,233	+21.2	-9.2
LA SCRTD	33,400	37,000	33,500	+10.8	-9.5
TOTAL SOUTH[4]	39,783	43,424	39,481	+9.2	-9.1
TOTAL RIDERSHIP[5]	44,521	49,218	45,539	+10.6	-7.5
BART	2,971	3,771	4,503	+26.9	+19.4
Statewide[5]	47,492	52,989	50,042	+11.6	-5.6

---

1. Changed from revenue to unlinked reporting method.

2. Excludes AC Transit due to changes in reporting method.

3. Strike.

4. Excludes Santa Monica due to changes in reporting method.

5. Excludes AC Transit and Santa Monica due to changes in reporting method.

DISCLAIMER

The views and conclusions expressed in this document are those of the staff and do not necessarily represent official views and policies of either the California Energy Commission or the State of California.

California Net Electricity Production by Fuel Type
(Million Kilowatt-Hours)*

	Coal	Oil	Gas	Nuclear	Hydroelectric	Other 1/	Total
1981	0	27,751	63,556	3,206	29,764	5,708	129,985
1980	0	39,275	50,272	4,920	40,780	5,093	140,340
1979	0	61,682	43,716	8,762	33,920	3,898	151,978
1978	0	60,736	29,879	7,659	37,206	2,994	138,474
1977	0	77,300	35,592	8,115	14,251	3,610	138,868
1976	0	59,666	29,434	4,807	23,193	3,635	120,735
1975	0	48,321	27,641	6,071	40,103	3,266	125,402
1974	0	39,733	28,887	3,698	46,422	2,472	121,212
1973	0	47,453	46,318	2,631	38,754	1,991	137,147
1972	0	26,414	62,458	3,175	31,755	1,484	125,286
1971	0	21,082	58,078	3,519	39,018	588	122,285
1970	0	13,002	67,415	3,132	38,082	574	122,205

1/ Includes generation by geothermal, wood, and waste.

*Data from Energy Information Administration

The CHAIRMAN. I will hazard a guess, and that is that some of the downturn in heating, home heating, has been because of a shift to electric for heat, or heat pumps, and that the majority of that increase in electric consumption or electric demand has been gotten by burning oil, so you shifted maybe a consumption pattern, but the totals haven't declined.

Dr. O'BRIEN. Well, there is another factor, too, and that is that snow and water make a great deal of difference in California. The last couple of years have been years in which there has been a considerable amount of snow cover so that does affect the electrical generation there as well, so it would be interesting to look at that and see how that balances out.

The CHAIRMAN. But if I understand your answer, you have indicated there is some structural changes in use of energy which you assume will continue?

Dr. O'BRIEN. Yes.

The CHAIRMAN. But even if we assume that they continue, any upturn of economic activity demands some increase in energy usage. Even if it is more efficiently used, you would have to have increased future efficiency to offset increased economic activity in the future, or you would have an increase in consumption of energy, would you not?

Dr. O'BRIEN. Yes; but I think again the market sometimes takes a little time to react, and I think the market and the changes which have been generated by market forces are going to continue for some time, and I think for the next year or two.

The CHAIRMAN. You mean you expect increased future energy efficiency gains over the present?

Dr. O'BRIEN. Sure, from capital decisions which have been made.

The CHAIRMAN. But have not yet been implemented; can you identify those?

Dr. O'BRIEN. Well, sure. This would be investments, switching from oil to natural gas, those decisions which have been made by many household users again to put in the new furnace. You are not likely to change it back unless there is——

The CHAIRMAN. That is assuming that natural gas prices won't be deregulated?

Dr. O'BRIEN. Yes; but even if they are, the likelihood that you are going to, you are not going to convert back I think is very real because you have made your investment in natural gas.

The CHAIRMAN. Those switches have already taken place. You are talking about future switches?

Dr. O'BRIEN. Yes. Right.

The CHAIRMAN. I am really puzzled by this assumption that somehow future energy efficiencies are going to be greater than present energy efficiencies, more in sufficient quantity to offset increased economic activity.

Dr. O'BRIEN. We have said, I think, in the testimony, too, we have said that we expect demand to turn upward after 1985. I think again it is a very difficult question.

The CHAIRMAN. You say you expect it to turn up after 1985?

Dr. O'BRIEN. Right.

The **Chairman**. On page 10 you say just exactly the opposite. You say you expect it to remain flat between 1983 and 1985 and decline slightly thereafter to 1990.

Which statement would you rather have stand?

Dr. **O'Brien**. I will stick with the decline.

The **Chairman**. You stick with the decline rather than the upturn?

Dr. **O'Brien**. Yes, to 1990.

The **Chairman**. We know that there used to be a one-to-one link between energy consumption and GNP that extended from the late fifties until the late seventies. For a 3-year period there was a break in that, but then it re-established itself about 1970, or 1971 to a 1-for-1 relationship until the crash shock of 1974. Since 1974, we have seen varying ratios as prices changed and as supplies changed. We are to the point where we now have perhaps in the last year a 2.6-to-1 relationship.

For every 1-percent increase in GNP, there is about a six-tenths of 1 percent increase in energy consumption. That is a dramatic change. You are projecting that it will continue to change even more so that economic upturns in the future of 1 percent would be matched by an energy upturn of less than six-tenths of 1 percent. Am I correct in interpreting your remarks in that fashion?

Dr. **O'Brien**. Yes. John, you worked on this part of the testimony.

Mr. **Brodman**. Since the last round of oil price increases in 1979 and 1980, and with the onset of economic recession, there has been an acceleration in the decline of both oil consumption and energy consumption required to produce a unit of GNP.

The **Chairman**. To what point?

Mr. **Brodman**. Not just in the United States, but in most of the industrialized countries as well; if you look at the period from 1973 up until 1979, the amount of energy consumption required to produce a unit of GNP was declining in the industrialized countries.

The **Chairman**. That was during the year of rising prices, dramatically rising prices?

Mr. **Brodman**. That's right. It was declining there at the rate of just a little less than 2 percent a year, but since 1979 that rate has accelerated primarily because of both the structural change in the composition of output that occurs during a cyclical downturn and also because of ongoing efficiency improvements and response to the rapid runup in both oil and energy prices so that the amount of energy required to produce the unit of GNP has declined in the industrialized countries by approximately 5 percent a year over the last 3 years or the last, in 1980 and 1981, probably again this year.

That means that in order to keep energy demand from falling, real GNP probably would have had to rise on the order of 4 to 5 percent a year just to keep energy demand flat. Now next year in 1983 with the outset of economic recovery, we expect there will be both a cyclical change in the composition of output so that some of the recession-depressed, energy-intensive industries will be producing more and require more energy, but there will also be a continued response in the way of efficiency improvements as a result of the high overall energy prices so that we feel in the industrialized countries as a whole, energy demand per unit of GNP will not decline as fast next year as it has in the last few years.

The CHAIRMAN. What do you expect that relationship to be—0.3 to 1, 0.4 to 1, 0.5 to 1?

Mr. BRODMAN. We are confusing two issues here. One is the relationship between the growth of energy demand and the growth of economic output.

The CHAIRMAN. That is why I am trying to link the two together if I can.

Mr. BRODMAN. Yes, and the other issue I have been talking about is the actual amount of energy required to produce a unit of output.

The CHAIRMAN. I am not sure that I understand the difference between the two.

Mr. BRODMAN. Well, the concept I think you are discussing is a percentage change in energy requirements over percentage change in output, and the concept that I am looking at is really a volume or an amount of energy required to produce each dollar of output.

The CHAIRMAN. I understand that, but each dollar is measured in GNP and each output is measured in energy. They are the same thing stated in different ways. I don't understand the distinction between the two.

You said, well, I don't mean to pursue that any further unless you think you can elucidate a little further so I understand.

Mr. BRODMAN. Well, let me try, if that is OK with you. If we have a $1 increase in our GNP, well, let's say it required 1,000 Btu's to produce each dollar of GNP, and if we had a 1-to-1 relationship between energy change in energy demand and change in GNP, and if GNP grew by $1, then our energy consumption would grow by 1,000 Btu's.

Now if we had a 0.8 relationship between increase in GNP and an increase in energy demand or energy demand to GNP, then $1 increase in GNP would only require an increase of energy consumption of 800 Btu's.

The other way of saying that would be to say that the energy demand required to produce an increment of GNP has fallen by 20 percent.

The CHAIRMAN. I understand that, but I still don't understand how that differs from making a projection in the future as to the relationship between GNP growth and energy consumption. You can express it in different terms, but the relationship is the same, is it not?

Mr. BRODMAN. That is correct.

The CHAIRMAN. If you could do it then, could you relate what you are talking about in percentage of decline of energy consumption related to GNP, to the ratio between energy consumption and GNP? The links are exactly the same. It is just a different way of measuring it.

What are you anticipating that that linkage will be? What do you think it will take in energy consumption to support growth in GNP? For each 1 percent of GNP, how much increase would there be in the energy consumption?

Mr. BRODMAN. The point I guess I would have to make here is that the relationship is not linear, and it fluctuates considerably over the course of the business cycle, and with the overall magnitude of the growth in GNP. Also year to year short-term changes in these two factors can be affected by many things such as the weather, changing patterns of fuel consumption, a less efficient fuel to a more efficient fuel, but with the onset of economic recovery over the next few years, we might expect that overall energy demand to grow in the industrialized countries, perhaps only half as fast as the rate of growth of GNP.

The CHAIRMAN. Point five?

Mr. BRODMAN. Yes.

The CHAIRMAN. It took a long time to get that. Point five to one instead of the point six to one we have now?

Mr. BRODMAN. Perhaps in the long term.

The CHAIRMAN. If we have a real increase of 4 percent in GNP, then you would expect to have a real increase in energy consumption of 2 percent?

Mr. BRODMAN. That is correct; perhaps no increase in oil consumption.

The CHAIRMAN. What?

Mr. BRODMAN. Perhaps no increase in oil consumption.

The CHAIRMAN. Perhaps, and you have to look at the composition of GNP, too. In recent years GNP has grown more in the services sector than it has in the production sector, and as a result, the services sector is generally speaking less energy intensive than is the production sector. Is that correct?

Mr. BRODMAN. That is correct.

The CHAIRMAN. If that trend continues, if we go more into services and less into production, you would see a declining amount of increase in energy consumption as measured in percentage of GNP? I think that would be correct.

Mr. BRODMAN. That is correct.

The CHAIRMAN. But if you have any real increase in GNP you would expect to have a real increase in energy consumption, would you not?

Mr. BRODMAN. Not necessarily; for example, in 1981 in the United States, real GNP grew by close to 2 percent, but overall energy consumption in the United States actually fell.

The CHAIRMAN. But if you are making plans over a 10-year period——

Mr. BRODMAN. Over a 10-year period, yes, that is correct.

The CHAIRMAN. Mr. O'Brien, we have mentioned just a moment ago that on page 10 you indicated that you expected oil demand to decline slightly from 1985 to 1990, and I think that is the statement you said, you indicated you stand by.

On page 11 you indicate the longer the current so-called glut or oversupply in the world oil market persists in the early part of the decade, the higher global demand is expected to be later in the decade.

Dr. O'BRIEN. These are relative judgments. As I noted, as we noted on the testimony on page 10, we are talking about the decline taking place slightly in the industrialized countries, but that will be offset by rising oil demand within OPEC and non-OPEC developing countries, and a couple of trends there.

The CHAIRMAN. This figure, this statement on page 11 then would reflect the increase in the nonindustrialized countries?

Dr. O'BRIEN. Nonindustrialized countries.

The CHAIRMAN. Offset the decline in the industrialized countries?

Dr. O'BRIEN. Right.

The CHAIRMAN. I am still perplexed by the notion that we have economic growth and declines over time, and I think I understood your colleague there to indicate that over a period of the next 10 years if there is an increase in GNP there would be an increase in energy consumption, although in fairness you also said it might not be oil.

I don't know what else it is going to be. We can't mine coal or transport it or burn it, and we certainly can't build nuclear plants, so I am not quite sure what is going to come on in the next 10 years instead of oil if we have an increase in energy consumption. Natural gas perhaps?

Dr. O'BRIEN. Gas certainly.

The CHAIRMAN. I think gas certainly, but that will be affected, will it not, upon decisions made between now and 1985 and whether or not it is decontrolled in 1985?

You also indicated that part of the reason for the decline and part of the reason for the increased energy efficiency was the response to price increases?

Dr. O'BRIEN. Right.

The CHAIRMAN. You are now predicting price declines but still increased efficiencies? Isn't it a likelihood if prices decline, the energy efficiency, the drive toward energy efficiency also abates?

Dr. O'BRIEN. Of course this is a very difficult thing to get a handle on because a lot of the responses that have taken place were based on essentially scenarios of increasing oil consumption, increasing prices. Those decisions were made. Capital was committed. There are commitments on the part of large segments of our industry and society to continue those.

The CHAIRMAN. What is the recent trend in auto purchases on large automobiles? Are they selling worse or better than they were a year ago?

Dr. O'BRIEN. I am not certain of that. Our office within DOE mainly tracks events outside the United States.

The CHAIRMAN. I will tell you then.

Dr. O'BRIEN. I'm sure you have a better answer.

The CHAIRMAN. The news is the trend is back to big automobiles.

Dr. O'BRIEN. Is that right?

The CHAIRMAN. Americans don't mind $1.05 a gallon or $1.10 a gallon as bad now as they did when it was compared to 65 cents.

Dr. O'BRIEN. Certainly I think that trend, we see a trend outside the United States within Japan, for example, the trend has been toward larger automobiles as well.

The CHAIRMAN. Mr. O'Brien, you said, you indicate in your testimony that the world oil market has been extremely weak during 1982. An article in the Wall Street Journal yesterday indicated that the oil market is now showing signs of strengthening largely because of the production cuts by OPEC.

Would you agree or disagree with the assessment in the Wall Street Journal article?

Dr. O'BRIEN. Certainly that is the case. The price of North Sea crudes are up about $3 over the official sales price, somewhere between $33.50 and $34. The price of Arabian light has been up as well, but at the same time, Nigeria is having an extremely difficult time selling their crude at the official sales price of $35.50. I think that in some ways—there is also, of course, the announcement on the part of OPEC that here in the last day after a couple of days after Wednesday's meeting that the production levels were 15.8 million barrels a day. I am not certain that is an indication of their discipline or whether it is an indication that the market continues to be weak. In other words, it is difficult to find for countries like Nigeria and Libya, to find buyers out there for their crude at the price that they are asking.

It has not been difficult for the North Sea producers to find buyers for their crude which is priced at a much more reasonable market price of $31 per barrel, and of course, spot being driven higher than that.

The CHAIRMAN. Are you aware of any report that Saudi Arabia may be pressuring oil buyers to buy Nigerian oil at the posted price?

Dr. O'BRIEN. Yes. I am aware of that, but even there if one begins to make a calculation of, just assumes that those companies that could or would be pressured would essentially take all of their equity and term liftings that Nigeria still has, that is perhaps 700,000 to 750,000 barrels a day, Nigeria still has a long way to go to make that quota, and there were a whole group of buyers who walked away from Nigeria—Japanese companies and governments—that walked away from Nigeria. They simply were unwilling to pay that $35.50 price.

The CHAIRMAN. You think that regardless of pressure of the Saudis or anyone else, that is going to continue?

Dr. O'BRIEN. It is going to continue and those companies, first of all, there is a very limited number of companies who would be subject to that pressure.

The CHAIRMAN. On page 2 of your testimony you indicate that there are about 7 to 8 million barrels per day of excess production capacity worldwide. Is that right?

Dr. O'BRIEN. Right. That is our calculation, and that is a number I think that needs some explanation. Did you have a specific question?

The CHAIRMAN. I was just going to contrast that with the unclassified figure from the CIA which would place spare OPEC production capacity as about 13 million barrels a day, taking into account the war damage to the Iraq/Iran production facilities.

Dr. O'BRIEN. I think that is a number that needs an explanation. We have a calculation which we make which indicates that installed capacity within OPEC is about 41 million barrels a day. Now that is essentially what the facilities could do if everything was running and there was no war and Iran and Iraq were not physically damaged.

The number that I think you are quoting here is possibly a maximum sustainable number which is probably what, around 30, 32? Is that the total number you are using, maximum sustainable number? That would be a number that would be based on essentially the facilities operating over a reasonable amount of time a couple of months, and if there were not any constraints.

The CHAIRMAN. The figure that I have is 34.7, but you would have to subtract from that the loss of production because of the damage of Iran and Iraq.

Dr. O'BRIEN. That is an unclassified number. I think that number is a little out of date. We would probably place that number of sustainable capacity at somewhere around 30. Again, this is a difficult number to determine because it assumes that the system would be running pretty much flat out, with normal scheduling and maintenance.

The CHAIRMAN. I don't think our figures are much different than yours. I think we subtract Iraq/Iran war damage, we get about 30.6 based upon the CIA unclassified figures.

Dr. O'BRIEN. OK. The 30.6 million barrels a day would be a reasonable number, but I think one thing you have to remember, Mr. Chairman, is that the system has not been run in any of these countries, has not been run at that level for some time, and you have to have a number of things that cooperate. Your reservoirs have to cooperate, your pipeline facilities, your pumping facilities, your terminals. All of those things have to be running, and they haven't been run at that level for a long time, so it is a very rough estimate I think. That is my first point.

The second thing is that there is a number that we ought to consider here which we would consider to be the preferred production number, and this would be a number that the countries that had limits previous to the extraordinary meeting in March, numbers that they preferred to produce at. For example, the Saudis had a number of 8.5 million barrels a day; the Kuwaitis, 1.25 million barrels a day. In other words, some government restrictions, some policy-level restrictions, on what governments prefer to produce; when you factor those in, it comes down to the neighborhood of about 26 to 27 million barrels a day.

Now our estimate of excess production capacity is based on that number of what the OPEC governments would prefer to produce.

The CHAIRMAN. Prefer to?

Dr. O'BRIEN. If the market would support it, so that is the excess capacity number. Now that should be kept in the context, too, of a historic perspective because if one goes back to the 1960's, the difference between the production level and the sustained capacity in the system ranged from about 4 to 6 million barrels a day. That became much tighter when we got to 1972 at the time of the first major interruption, and it narrowed perhaps to about a million barrels a day. It expanded slightly after that and expanded to perhaps 3 or 4 at the time the North Slope and the North Sea began to come on line in the midseventies. It tightened considerably again at the time of the Iranian revolution and later during the Iran/Iraq war. It has now expanded considerably, and this 7 to 8 figure is more than at any time in history, and I think it is a factor certainly in what will happen in the future in the oil market.

The CHAIRMAN. As I recall the figures, in 1977 or 1978, before the Shah fell, world consumption was about 55 million barrels a day.

Dr. O'BRIEN. Yes.

The CHAIRMAN. World production capacity was a couple of million barrels a day above that.

Dr. O'BRIEN. Right.

The CHAIRMAN. And when the Shah fell, we lost 5 million barrels a day of oil production. That was about the loss in that timeframe. We went from a marginal surplus to marginal shortage by a swing of 5 million barrels; the price of oil doubled.

Dr. O'BRIEN. It did, and of course, during that time there was considerable inventory building taking place as well.

The CHAIRMAN. Wouldn't you say that again if you move into marginal shortage?

Dr. O'BRIEN. Oh, certainly.

The CHAIRMAN. Apparent demand is much greater than in those periods because people do build inventories.

Dr. O'BRIEN. Exactly, and I think our projections we have made here in terms of what the market will do is based essentially on a peace kind of perspective.

The CHAIRMAN. And what happens if we don't have total peace?

Dr. O'BRIEN. In our testimony, and I certainly agree with you, Mr. Chairman, if we don't, if you have a supply interruption, if you have any kind of an interruption that affects the mentality of the people in the market in terms of how they perceive that market, then you are going to have that sponge that I was talking about beginning to absorb that excess oil, and you are going to have upward price pressures and perhaps even supply problems, but again that is if we have the interruption, and I think the probability of interruption, well, that is anyone's guess. There are people who try to calculate these things. I don't think you can really calculate them.

The CHAIRMAN. Using mathematical regression, it would come to 100 percent over time. I don't think that it takes a mathematical genius or political genius either to say that the chance of an interruption of some kind somewhere in the next 10 years is almost 100 percent probability.

What effects have the closure of the Iraqi oil export pipeline by Syria had on Iraqi oil production and on the world oil market?

Dr. O'BRIEN. It has tightened it by about 700,000 barrels a day, and Iraqi exports now are completely through the pipeline that goes through Turkey, and I believe that is about 650,000 barrels.

The CHAIRMAN. They have not found an alternative way of exporting that oil, and it would take some time before they could?

Dr. O'BRIEN. Not until some settlement of the Iran/Iraq war takes place and they are able to begin loading in the Gulf.

The CHAIRMAN. What motivated Syria to take the action? How long do you expect it to continue?

Dr. O'BRIEN. Our perception of that is that the Iranians offered them a better deal, and that they have within the Arab world, there are political differences, and I think there are significant political differences between the Syrians and the Iraqis. It was basically a political move.

The CHAIRMAN. Do you expect that to continue?

Dr. O'BRIEN. I would think so, barring any major political changes in either country.

The **Chairman**. In your opinion, what impact would there be on the world oil market if you elected to increase the current fill rate of SPR by 100,000 or 200,000 barrels a day?

Dr. **O'Brien**. Well, in current conditions, without any kind of major swing in the demand, supply shortage, I don't think it would have a great deal of effect at this point.

The **Chairman**. Might it have a favorable effect upon the demand by reducing the uncertainty of supplies so people's judgment of excess inventory would be even lower? Isn't that one of the things they look at is the alternative supplies? If you have got a big reserve, they don't have to carry so much inventory themselves.

Dr. **O'Brien**. You are speaking of 100,000 to 200,000 barrels a day which I don't think would have that much impact. If it were a larger amount, yes.

The **Chairman**. If we increase the fill rate of the SPR so we are moving from 250 to 350 million, 500 million to 750 million, maybe even increase the target to a billion barrels in storage, wouldn't people then begin to say, well, there is an alternative source of supply, we don't have to be quite so much worried about supply interruptions, and therefore our excess inventory figures will be much closer to the actual date of consumption?

Dr. **O'Brien**. Well, again, I think when you get into something of that magnitude I would prefer if I might to defer that question to the next hearing when Mr. Vaughn would be up who I think can speak with much more authority about the SPR.

The **Chairman**. Thank you, Mr. O'Brien. I appreciate your response to the questions.

Dr. **O'Brien**. Thank you, Mr. Chairman.

The **Chairman**. The next witness is Dr. Herman T. Franssen, chief economist, International Energy Agency.

You may proceed.

STATEMENT OF DR. HERMAN T. FRANSSEN, CHIEF ECONOMIST, ECONOMIC ANALYSIS DIVISION, INTERNATIONAL ENERGY AGENCY

Dr. **Franssen**. Thank you, Mr. Chairman. I am Herman Franssen, head of the Economic Analysis Division of the International Energy Agency. The IEA was formed in 1974, and is composed of 21 major industrialized countries, and EEC also participates in our activities.

My particular capacity at the International Energy Agency is as an oil energy market specialist, and you have asked me in that capacity to provide you my views on the current world oil market for the short term and the implications for the longer term. It is indeed a pleasure for me and an honor to discuss my views here today.

You have before you a prepared statement for the record.

The **Chairman**. Dr. Franssen, that statement will be placed in the record in full.

Dr. **Franssen**. Thank you. I would like to summarize this now for you.

We have made some very significant progress indeed since 1973 when the normal price of oil during the past several years increased from about $3½ to $35 a barrel, and that was to be expected. The energy intensiveness of our economies has dropped significantly. The energy now used to produce an additional unit of GDP has declined by about 16 percent over the period from 1973 to 1981, and the oil intensity, the oil used to produce a unit of GDP has declined by a full 26 percent between 1973 and 1981.

In addition, we have seen some very significant improvements in domestic energy production, about 13 percent in the period from 1973 to 1980. Much of that was nuclear and coal, but even oil production has increased both in the United States and in the North Sea. Even with all this progress, when the economies recovered after the first oil shock, we saw again a growth in oil demand in the period from 1976 to 1978. There was ample oil available, and the price of crude was favorable at that time, so we went in effect from I think mainly ignorance prior to 1973 to a panic when the oil shock occurred in 1973, 1974, to some degree of complacency between 1976 and 1978, and the panic then again of 1979, 1981, and of course, the possibility that we are now back into the post-second shock complacency. I think it is interesting to just see what the moods were then because it is some reflection of possibly what we are thinking now.

Just about a few months before the collapse of the regime in Iran, the Commission issued a very big study, and the common wisdom at the time is very much reflected in what that study says, and I quote. "We judge it unlikely that there will be any sharp and sudden upward movement in real prices of oil for at least the next 10 to 15 years." This was published a few months before the Shah fell. The Shah fell in November, 1978, and in 1979–80, oil prices went up in nominal terms by a full 160 percent.

I think what this shows is that our record for projecting GNP growth, in projecting energy growth, in projecting oil prices, has not been too good because we have usually ignored the political factors.

We are now in a very deep recession in the OECD countries that started I think as a direct result of this second oil shock, and we have estimated that in 1980–81 the OECD has lost upward of a trillion dollars in combined OECD/GDP. I don't have the figure per capita, but somewhere around $1,300 for every person living in the industrial world. Our unemployment went up from 19 to 28 million as it is today, and it is still rising so that has had some effect obviously on energy demand and on oil demand in particular.

As a result of this recession and impact of higher oil prices, OECD energy demand again declined logically as is to be expected about 3 percent in 1980, another 2 percent in 1981, and oil demand declined further about 8 percent in 1980 and another 7 percent in 1981. This was only partially offset by small growth in the developing countries. I have some tables in my testimony on that.

World oil demand plummeted from 52 million barrels a day in 1979 to less than 47 million barrels a day in 1981. Of that decline, I think about 50 percent was due to a combination of conservation and doing without, and about 50 percent due to fuel switching; in other words, more use of coal and nuclear. But it is important to realize that this wasn't something that happened all of a sudden, but it occurred instead through our very careful management of energy affairs. After the first oil shock there was the very rapid growth of nuclear power and coal in that period and that has now paid off because the plants are on stream now. The investment decisions were made just at about the time or after the time of the first oil shock, and the energy demand now is much lower, in part due to the recession. We now see all these plants coming on stream nicely, and thereby lowering the demand for oil, backing out of oil.

U.S. oil demand has also declined very rapidly from about just over 19 million barrels a day in 1978 to about 16.4 million barrels a day in 1981. That is about 50 percent of the total reduction in oil demand in the OECD countries.

Now at the time non-OPEC supply increased by about 2 million barrels a day in this period from 1979 to 1981, so OPEC swing producers took the full cut in the world decline in oil demand and went down from 31.6 million barrels a day in 1979 to 23½ million barrels a day in 1981. That gets us to the current year.

Now contrary to our earlier expectations, and in fact to the expectations of the oil industry, oil demand again declined sharply in the first quarter of this year. Our current estimates are about 8 percent decline over the first quarter of last year, but we don't have any final figures yet, and the stock draw, again we don't have any final figures yet, but it should be somewhere in the vicinity of 4 million barrels a day worldwide.

Now again I think much of that current reduction in oil demand in the first quarter is due to the very serious recession in OECD. The current estimate for oil consumption in the summer quarter, quarters two and three, again is a few percentage points below last year's summer consumption, again due to the recession and to some further growth in conservation and fuel switching. Non-OPEC output is again slightly higher than it was at the same period last year.

Now that makes things a little bit different from previous years, in the normal year, the oil industry built stocks in the summer season for consumption in the winter season. Now this year due to an overhang of stocks, stocks over and above what is required both for working level stocks and for legal requirements in most OECD countries, the industry faced with much lower demand and high prices, is in fact drawing stocks in the summer quarter. Again, we don't know how much the stock draw will be, but we do know it is taking place, and it could be quite significant.

Now why are they drawing down stocks? First of all, there was unexpected low consumption in the winter of 1981-82, very soft demand. The industry felt that it was caught with more stocks than it needed. As late as November of last year, industry was still expecting some stock build because expectations for oil demand were a little higher than they are now, but now they are substantially lower, so they are drawing on stocks.

The reasons, as I said, have to do with the softening in demand and with the softening of demand, it has resulted in very substantial decline of the value of those products compared to what they are paying for that oil. The products are somewhere around $4 to $5 a barrel below the official sales price of most OPEC crude. In other words, you are paying more by buying than by leaving it in the ground, and in addition to that, for every barrel that you are holding you are paying about 50 cents a barrel a month to hold on to the stocks in interest charges and in carrying costs, so it is understandable. What is actually happening in the market is a reflection really of market forces. We do not know yet how high the stock draw will be in the summer season, but the way it looks now is that it will probably come to an end some time in the third quarter of this year, depending on how high the stock overhang is which we don't know as yet because we don't even know as yet how low the demand really was in the first quarter of this year, let alone what it will be in the second and the third quarter of this year.

What we do know is that crude oil production is currently running somewhere around 60 million barrels a day. Crude oil might be slightly higher, but it is somewhere in that vicinity. The average is likely to be a little higher because of what happened in the first quarter already, and the normal growth in the fourth quarter when the demand is a little bit higher than summer demand, and we are expecting in the second half of this year some degree of economic recovery in the United States which will strengthen demand a little bit toward the very end of the year, but the next few months are very important for further oil market developments.

By the autumn we expect the market will have bottomed out. There is very much speculation at the moment about the price structure, whether it will hold or whether it will not hold, but we really don't know. It is really very difficult. We can speculate. We can guess, but we don't know until we really get there.

We expect oil demand to grow again somewhat in the winter toward 1982-83 because of the normal seasonal factor, but demand may not necessarily be much above that of the winter of 1981-82. Much will depend on the economic recovery in the United States. The mid-term 1983 through 1985 we do expect an economic recovery led by the United States, and subsequently the growth in energy demand when we get out of the recession, like when you go into the downswing of the business cycle, energy demand tends to be much lower than economic growth. Subsequently when you get out of the recession, we tend, we believe that then your demand will be somewhat higher in the initial phases than your economic growth, so we expect some modest growth over the medium term in OECD energy demand, and subsequently some increase in oil demand.

For example, by roughly 1985 we would expect that total free world oil demand will run somewhere again at about the 1980 level, somewhere between 48 and 50 million barrels a day, and OECD demand, industrial countries' demand, somewhere around 35 to 36 million barrels a day. Again, there is a range, Mr. Chairman. It could be a little lower, could be a little higher. We really don't know for sure.

As far as the demand for OPEC oil is concerned, our current ranges are somewhere between 24 and 25 million barrels a day. It is not just crude oil, it is crude oil and liquids which is well within the ability and willingness to produce in periods of let's say when no additional wars or revolutions occur in any major producing country. So in the medium term we would argue that if everything is normal, if everything works well, there would continue to be downward price pressure on oil for a number of years to come.

I am not saying that the nominal price of oil will go down, although I would not exclude this possibility, but we would argue that in real terms, oil prices are likely to decline somewhat in the next couple of years unless there are again some very unusual events in the Middle East over and above what has already happened, and one should not exclude that possibility.

Now the current soft market that we are in, it causes, of course, a great risk of complacency, the same kind of complacency that we have been faced with before, and as I indicated to you before, Mr. Chairman, in the past we have been so dead wrong in projections. As I look back 10 years ago, the common wisdom was that the industrial countries would continue to grow at 5 percent per year through the year 2000. Five years ago the common wisdom was we would be growing at about 4 percent a year through the year 2000. The current common wisdom is that the best we can hope for is 3 percent, and that common wisdom may change again upward or downward.

The same I can say about long-term conservation impact. We know very little about long-term price elasticity which in most of the econometric models that we use to gage future energy and oil supply, the ranges of these long-term elasticities are huge. There is a very big degree of uncertainty in there, and over a period of 10 years that uncertainty adds up to many, many million barrels a day of oil per year. If we are going to be faced with a period, and I said it is quite likely, of declining real oil prices for a number of years, what will this do to the kind of car makes that we will see our manufacturers produce?

As you already said, Mr. Chairman, there is an indication that people are returning to bigger cars. Now they may not be returning to gas guzzlers, but there may be more demand for 6-cylinder cars than 4-cylinder cars. There is already an indication that a lot of the airlines are reconsidering the purchase of the 757's and 767's because one of the main reasons for building these aircraft was that they are very energy efficient, but if you look, if your perception of the future is lower prices of kerosene, you may postpone your decision to purchase such aircraft.

Then, of course, what is even more serious is that these perceptions may lead to a very significant reduction in investment in alternative energy sources. We have already seen what is happening to our nuclear industry, and I saw an statement recently by the Chairman of the Nuclear Regulatory Commission of the possibility that 19 nuclear powerplants could be canceled. If we are faced with this kind of situation, we might see a very poor state of our nuclear industry in the 1990's when we certainly will need the nuclear industry. Will it then be able to come up with new designs that the 1980's will require or will we not be able to do that?

In this kind of climate we might be faced with this kind of possibility which, until even 1 or 2 years ago, was considered to be the wave of the future. By the way, up until a few years ago, everybody thought that coal would never return to take any significant place in our energy demand, but now again we find that if oil prices were to decline significantly in real terms, that especially in

OECD, Europe and OECD Pacific, Japan, that coal may become much less competitive and the decision may be postponed to switch more rapidly to coal.

Synfuels, there again we see about how we have changed our perceptions of the forecasts. Until 2 years ago Exxon was projecting by the year 2000 we would be producing somewhere around 6 million barrels a day of synthetic fuels in this country. Currently they are expecting very substantially less. I don't know what the latest forecast is, but I think it is somewhere around 1½ million barrels a day of synthetic fuels by the end of the century, and with the current very rapid decline in profitability and a lot of oil companies, including major oil companies, one can foresee even in the more shortened term a very substantial decline in oil and gas exploration and development, so there again we may see some reduction.

Now if there are no further supply interruptions, there are no major problems. I think through the mid-1980's because of the kind of spare capacity that is still in the market, as Mr. O'Brien already alluded to, there will be lower real oil prices and as a result possible major reductions in energy investment which could cause very serious problems, Mr. Chairman, for the second part of the 1980's, even if at that time we were to get very small supply interruptions as opposed to very major ones.

Now why is that? I believe that there is a good chance that unless oil prices were to collapse, which I don't believe, but that with slowly declining real oil prices, that OECD industrial countries' oil demand could at best remain flat from what it is now through the end of the 1980's; but in some of our other scenarios it could also move up again to somewhere of the 1980 level, and there is no certainty about this. I cannot give you a specific forecast because if I did that I would be either lying to you, or I would be having some divine inspiration which unfortunately I don't have.

Now on the supply side, I think that as a trend, at least in North American and in the North Sea, of declining production in the second half of the 1980's. One does not have to take a specific number. For example, Exxon expects, as you know from its forecast, that oil production in the United States could very well decline by about 30 percent by 1990, and other forecasts are a little bit more optimistic and are talking about a 10-percent decline in supply. The Canadian production is declining and is not likely to turn up with the Hibernian Field coming on stream in late 1980.

The North Sea British production is still rising and is likely to peak in the next few years, and thereafter decline because all the big fields in the British sector have been found.

In the Norwegian sector there are a lot of delays and the Norwegians are telling me that they don't expect much of an increase in oil production in their sector in this decade. Therefore, after the mideighties, imports in the industrial countries could rise again substantially. I say could. I didn't say will, and in the United States alone I have seen oil industry demand estimates running from 14½ to 17 million barrels a day by 1990, and credible supply estimates of oil and liquids running from 7½ to 9½ million barrels a day. What that suggests, Mr. Chairman, is that oil imports in the United States in the latter part of the eighties could be as low as 5 million barrels a day, but then again they could be as high as 10 million barrels a day, and nobody can tell you now what is going to happen.

In addition to that, there is a significant rise in developing country demand which is particularly high in the oil producing developing countries, and very little analysis has been done by international institutions and by the oil industry so that we really don't have a very good grasp of this issue. But if economic growth returns to normal levels in the OECD, I don't see no reason why it wouldn't, we are expecting that developing countries will also be growing faster and they don't have the kind of savings potential that we have. So oil demand is likely to grow fairly rapidly once economic growth recovers.

Then there is, of course, the likelihood that the Communist countries will turn from net exporters to at least zero exporters by the mideighties, and there is a small possibility that they will become net importers of oil toward the second part of the 1980's. We still expect that while oil supply in the non-OPEC developing countries will continue to rise fairly rapidly, that their demand would be rising more rapidly than the supply for the non-OPEC developing countries as a group, but as a group by the second part of the 1980's they could become, be importing more oil from OPEC than they have done in recent years, so what does this suggest?

This suggests that the demand for OPEC oil could very well be rising again substantially after the mideighties, and in addition, that the export, available export barrel may shift from the current composition to a more Mideastern barrel because countries like Venezuela, Nigeria, Indonesia, do not have very much additional potential for further increases in oil production, while there is very vast populations compared to their reserves, that demand will be rising more sharply. As a result their exports are likely to decline over time, and subsequently whatever additional available capacity there is within OPEC is likely to shift more in the direction of a Middle Eastern barrel which then increases by definition the supply risks in the second part of the eighties. Whether this will be in the early part or the second part of the eighties or the latter part again depends on a lot of other factors, but we must count as indicated, Mr. Chairman, on the potential for interruption based on past experience. I think the CIA has said there was somewhere around 12 major interruptions since the 1950's, and we have witnessed at least three major ones since 1973, with disastrous consequences for our economies, and if there were to be major supply interruptions in the late eighties or early nineties, Mr. Chairman, it could be more serious for our economy than even the previous ones.

Why? Because we have been backing out the heavy end of the barrel and we will continue to do so I think. That was substitutable because of all the additional nuclear power and coal coming on stream, but if your barrel will consist primarily of the middle distillate and gasoline which are much less easy to substitute, and a supply interruption were then to take place, it could cause more serious economic consequences.

The free world continues to be highly dependent on Middle Eastern oil, and political instability continues to be very significant in that part of the world. While we can be very proud of past performances in the OECD countries as far as reduction in demand is concerned, it is still too early to argue that occurrences of 1983-84 and 1979-80 cannot happen again, and they could once again play havoc with our economies.

We must, therefore, be sure that we continue to be prepared to cope with supply interruptions, and we must continue to have long-term programs which will encourage conservation and which will encourage the development of alternative energy sources such as coal and nuclear and speed up exploration and development of indigenous oil and gas.

Thank you, Mr. Chairman.

[The prepared statement of Dr. Franssen follows:]

Statement of Dr. Herman T. Franssen

Head, Economic Analysis Division, International Energy Agency

Committee on Energy and Natural Resources

United States Senate

23 April 1982

Introduction

Mr. Chairman: I am Herman Franssen, Head of the Economic Analysis Division of the International Energy Agency. The IEA was formed in 1974 and is composed of 21 major industrialized countries. The European Economic Commission also participates in IEA activities.

Major decisions of the IEA are made by the Governing Board, composed of Ministers or their high ranking representatives from each of the participating countries. Four Standing Groups and a Committee on Research and Development report to the Governing Board. The Standing Groups each deal with a principal area of concern to IEA Governments, namely, long-term energy cooperation, the oil market, cooperation on research and development, emergency questions and relations with producer and other consumer countries. The IEA Secretariat, which is headed by an Executive Director, is composed of 61 professionals, including 14 Americans.

Industrialized countries had one overriding objective in setting up the IEA. This was to protect the economies of oil-consuming countries from serious adverse economic impact resulting from highly unusual developments in energy markets, but principally the oil market. We are all familiar with the disorganized reaction to the 1973/74 oil embargo and unprecedented price increases. The scramble for oil supplies, while perfectly natural from the national point of view, did little to enhance a common understanding of the situation. The 73/74 events, both the oil developments and our reactions to them, did, however, finally convince Western political leaders that energy security could best be attained through adequate preparation against unexpected supply disruptions and through encouraging long-term structural change to reduce oil dependence and thus reduce vulnerability. They also realized that to be effective, both of these efforts required international coordination.

Industrialized countries were also aware that, to begin to understand the tremendous change which was taking place in the international oil market, with the consequent repercussions on global political and economic relations, required an objective assessment of world oil and energy markets. In assessing energy supply and demand developments, overall in global terms and in individual countries, the IEA has been able to identify areas where energy policies could be strengthened. This has helped Member countries in their efforts to better align their domestic policies with the realities of energy markets. The events of 1979/80 led Member countries to conclude that this area of work should be further strengthened. At present the short-term world oil market analysis which takes into account submissions by governments in turn is updated on a monthly basis at the IEA Secretariat in order to provide policy-makers with timely information and analysis on changes in consumption and oil supply as well as stock movements.

Current Oil Market Situation

I would like to discuss briefly current developments in the international oil market, the significance IEA attaches to them and how we see short, medium and longer-term developments.

1. Overview

Over the past few years the world oil market has fluctuated violently. The present situation may be compared with 1976 when, following the 1973-74 price rises and the ensuing world recession, world oil demand was low and there was significant spare OPEC production capacity. This apparent calm proved treacherous. By 1978 oil demand was creeping up again and when the Iranian revolution disrupted production a further price explosion resulted. Some in industrialized countries misinterpreted the message in 1976 and as a result efforts to reduce oil dependence slackened.

While energy consumption in OECD countries fell nearly 2 percent in 1981, oil consumption fell about 7 percent and is likely to decline further in 1982. For the full year 1982, OECD oil consumption is now estimated to be about 3-4 percent lower than 1981 consumption, which would bring it to a level some 17-19 percent below the 1979 level. This compares with an estimated 7 percent reduction in total OECD energy consumption for the same period. The estimated reduction in oil use is due in part to lower economic growth, the impact of oil price increases on improving energy efficiency and interfuel substitution, and government measures to restrain oil demand, promote conservation and fuel switching.

A constant danger persists that the unusually low level of oil demand in 1981 and probably also in 1982 and 1983 could lead to complacency in major consuming countries, causing significant reductions in commercial stocks and postponement of investment in non-oil energy supplies. If complacency were to persist, the result could be higher dependence on oil late in the 1980s with the danger of substantial upward price pressure in case of supply interruptions.

Table 1

World Oil Supply and Demand(1)
1979-1982
(mbd)

	1979	1980	1981	1982
World Oil Consumption(2)				
United States of America(2)	18.7	17.4	16.4	15.6
Other OECD	23.1	21.2	19.6	18.8
Developing Countries	10.4	10.8	10.9	11.2
TOTAL	52.2	49.4	46.9	45.6
World Oil Supply(2)				
United States of America(2)	10.7	10.8	10.8	10.8
Other OECD	4.5	4.6	4.8	4.9
Other Countries	6.4	6.7	7.4	7.5
TOTAL	21.6	22.1	23.0	23.2
Additional Requirements	30.6	27.3	23.9	22.4
OPEC Production	31.6	27.6	23.5	
Total Stock Build (or Draw) to Balance	1.0	0.3	(0.4)	

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(1) includes NGL
(2) includes processing gains.

Oil Consumption 1978-1981

In 1979, the first full year of the second oil shock, the OECD economies still grew at an annual average of 3.3 percent. Total primary energy demand rose by about 2 percent and oil consumption by 1 percent.

In 1980 when real GDP rose about 1.1 percent in the OECD countries, energy demand fell by 3 percent and oil consumption by 8 percent. With economic growth of 1.2% in 1981, energy and oil consumption fell respectively by 2 and 7 percent.

For most of the 1978-81 period the reduction in oil consumption was fairly evenly divided between the major OECD regions.

While it is still too early to speak of a trend in developing country oil consumption, higher prices, lower economic growth and foreign exchange problems have also reduced oil demand growth in the developing countries in recent years. In contrast to recent experience in the industrial countries, there is, however, no indication yet of any significant change in the relationship between energy and economic growth in the developing countries.

The combination of declining oil consumption in the industrial countries and sluggish growth in the developing countries has resulted in a fall in free world oil consumption from 52.2 mbd in 1979 to an estimated 45.6 mbd this year.

Table 2

U.S.A. and OECD Oil Consumption 1978-1982
(mbd)

	U.S.A.[1]	Other OECD	Total OECD	Total[1] Free World
1978	19.3	22.1	41.4	51.3
1979	18.7	23.1	41.8	52.2
1980	17.4	21.2	38.6	49.4
1981 (est.)	16.4	19.6	36.0	46.9
1982 (est.)	15.6	18.8	34.6	45.6

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1) includes processing gains

It has proven to be very difficult to measure the relative importance of the various factors accounting for the dramatic fall in oil consumption over the past two years. Each of the following, however, has played an important role:

Economic Growth: Economic growth in the IEA countries declined sharply from 3.3 percent in 1979 to 1.1 percent in 1980, 1.2 percent in 1981 and a forecast of 0.5 percent in 1982. Although economic performance was uneven across countries, part of the oil demand reductions are attributable to lower growth.

Prices: World oil prices increased by about 160 percent in stages over 1979 and 1980 and conservation responses to these consequent large money rises in petroleum product prices account for a significant portion of the reductions in energy and oil consumption.

Interfuel substitution: Substitution of other fuels, primarily coal and nuclear for oil, increased significantly throughout 1978-1981.

Government Policy and Consumer Expectations: Persistent efforts by Member governments to restrain demand for imported oil through improvement of energy efficiency standards, oil decontrol in the United States, major efforts to promote interfuel substitution, and dissemination of information concerning the problem of oil supply and prices have added to the reduction in oil demand in the OECD.

Special Factors: Weather and consumer destocking have also played a role in understanding the declines in oil consumption since 1979; and oil company destocking is adding to the decline in 1982.

Oil Supply 1978-1981

As shown in Table 3, non-OPEC supply will have increased by close to 2 mbd between 1979 and the second half of this year. While most of the growth is the result of rapidly increasing production in developing countries such as Mexico, the industrial countries have also succeeded in increasing production in recent years.

Table 3

Non-OPEC Oil Supply 1979-1982
(mbd)

	1979	1980	1981	1982
OECD	14.7	14.8	15.0	15.1
Developing Countries	5.3	5.7	6.3	6.4
Net Exports Communist World	1.1	1.0	1.1	1.1
Processing Gains	0.5	0.6	0.6	0.6
Total Non-OPEC supply	21.6	22.1	23.0	23.2

Demand for OPEC Oil 1979-1981

At times of high demand for oil in the non-communist world, market developments have depended largely on OPEC's ability and willingness to supply oil relative to demand. When the market is weak OPEC suppliers have often shut in capacity rather than putting downward pressure on the price structure, while other oil producers have tended to market the full volume of their output.

As shown in Table 4, the decline in world oil demand since 1979 has reduced OPEC's share of free world oil supply from 59 percent in 1979 to 51 percent in 1981. It will probably decline further in 1982.

Table 4

Free World Demand for OPEC Oil, 1979-1981
(mbd)

	1979	1980	1981
Free world oil consumption	52.2	49.4	46.9
Stockbuild (or draw)	1.0	0.3	(0.4)
Total Oil Demand	53.2	49.7	46.5
Non-OPEC Supply	21.6	22.1	23.0
Demand for OPEC Oil	31.6	27.6	23.5

Free world demand for OPEC oil in 1982 may be close to 40 percent below the 1979 level. In comparison, demand for OPEC oil fell 11 percent between 1974 and 1975 (following the first oil shock) but a year later, in 1976, demand for OPEC oil had been restored to the 1973-74 level.

1982 Oil Market Outlook

The year 1982 has been characterised so far by further reduction in oil consumption and continued stockdraw. Much of the recent and expected additional fall in energy and oil consumption is caused by the deepening recession in some OECD countries.

Until late last year it was expected that the world economy would recover at least by the second quarter of 1982, leaving free world oil consumption virtually unchanged from the 1981 level. However, recession in the U.S. turned out to be deeper than expected in the fourth quarter of 1981 and the first quarter of 1982, causing oil consumption to decline substantially below previous expectations.

Consumption

With oil consumption in the OECD countries continuing to decline in the final quarter of 1981, product prices began to fall. As shown in Graph 1, the five months between November 1981 and late March 1982, spot cargo prices of oil products in Rotterdam and the U.S. Gulf fell by an average of respectively $5.50 and $5.00 a barrel.

The soft product markets caused spot crude prices to fall also, as shown in Graph 2. Recent, mid April spot prices for Arab light were reported at $30.70., Iranian Light at $28.50 and North Sea Forties at $31.50 a barrel. This compared with official sales prices of respectively $34.00, and $30.20 for Arab and Iranian Light. Official sales prices of Nigerian Bonny light, comparable to Forties crude is $35.40.

The netback values of these crudes (based on the revenue earned by selling the yield of products less incremental refining and freight costs) were even lower than spot crude prices. Some refineries were therefore closed down in favour of buying products on the open market.

1982 Summer Quarters

Non-communist world oil demand in the summer quarters of 1982 is projected to fall by about 1 mbd compared with last year's consumption in the summer quarters. Again, the fall in oil demand is projected to be most pronounced in the industrial countries due to the recession, continued conservation and fuel switching.

Assuming a recovery in the U.S. economy in the second half of this year, free world oil consumption is projected to grow to 47.2 mbd in the fourth quarter, or only 1 percent below fourth quarter 1981 consumption.

World consumption for the whole year 1982 is estimated at 45.6 mbd, about 3 percent below 1981.

Oil Supply

Non-OPEC oil production has continued to grow slightly in spite of the low overall oil demand. There are several reasons for the continued growth in non-OPEC oil production. But the fact that in today's weak oil market little non-OPEC oil has been shut-in is largely due to the fact that non-OPEC oil prices reflect more closely the market values of the crudes than OPEC oil.

Oil production outside of OPEC is projected to grow to slightly above 23 mbd in 1982. Hence, the entire decline in free world oil consumption will be born by OPEC.

Stocks: The oil industry built up its stocks to high levels in 1979 and 1980 due to supply insecurity and fear of further price increases. By 1981 a supply shortage was no longer foreseen; prices stabilized and the cost of holding stocks became increasingly expensive. When 1981/82 winter demand turned out much lower than expected, the desire to reduce stocks became stronger and spot prices declined. Most industry estimates suggest a total stockdraw on land and at sea close to 4 mbd for the first quarter, which is somewhat above normal.

With product netbacks running $4-$5 a barrel below official selling prices of most OPEC crudes, and with costs of about $0.75 a barrel per month in interest and storage charges to hold a barrel of oil, there is a desire on the part of oil companies to reduce stocks, which would explain the relatively heavy stock draw which has already been observed so far in 1982.

The full extent and duration of the stock draw will depend on a number of factors, the most important being the size of stock "cushion", i.e. stocks on land and at sea over and above working level and legal requirements, and expectations of pricing developments later in the year.

It will take much of the second and third quarter before these "excess" stocks will have been drawn, and subsequently demand for OPEC oil may remain quite low until sometime in the fall of this year. However, over the year as a whole it should be between 20-21 mbd, several million barrels per day higher than at present.

Producer countries have expressed their determination to adjust to the current lower level of oil demand by agreeing on production quotas at the Vienna OPEC meeting in March. There are currently some indications that OPEC oil production is now running below the agreed upon overall quota of 17.5 mbd.

Moreover, any appraisal of the oil market situation must take into account the large underlying uncertainty caused by the overall political situation in the Middle East.

Medium Term Oil Market Outlook through 1985

With respect to the near future, the critical question is whether there will be a virtual cyclical repetition of demand developments as observed between 1973 and 1978.

At present, however, overall energy demand is likely to continue its decline from the peak reached in 1979. Due to the lead times in the responses to the large price rises in 1979 and 1980, energy demand may decrease by about another 3-4 percent in 1982, assuming economic growth of 0.5 percent and a further drop in real oil prices of 7 percent. But the turning point may be near. In fact, OECD projections for economic growth suggest an economic recovery at rates around 3 percent for the year 1983. This, combined with a further real decline in oil prices, could lead to an increase in total energy requirements of up to 2 percent in 1983.

Assuming a recovery of the world economy beginning sometime during the second half of 1982, the combination of an estimated 3 percent OECD economic growth in 1983, coupled with unchanged nominal oil prices, would result in some growth in world oil demand (see Table 5).

Table 5

Estimated Free World Oil Demand, 1981-1983
(mbd)

	1981	1982	1983
U.S.	16.4	15.6	15.7
Other OECD	19.6	19.0	19.2
Developing Countries	10.9	11.2	11.5
TOTAL	46.9	45.6	46.4

Non-OPEC oil supply in 1983 is projected to grow by a few hundred thousand b.d. and the stockdraw will probably have come to an end. Hence, demand for OPEC oil would grow from about 20 mbd in 1982 to 23 mbd in 1983.

Barring any unforeseen major interruptions in world oil supplies and assuming economic growth rates averaging about 3 percent per year in the OECD countries between 1983 and 1985, OECD demand for oil in 1985 is projected to range between 35 and 36 mbd. With developing country demand estimated to increase from 10.8 mbd in 1980 to between 13 and 14 mbd by the mid 1980s, total 1985 free world oil demand could range between 48 and 50 mbd, which is about equal to -- or slightly lower than --, the 1980 level.

Further growth in non-OPEC oil supply, in particular in the non-OPEC developing countries and the North Sea, would keep demand for OPEC oil within a range of 23-25 mbd. As this is well within the range of projected OPEC oil availability, little upward price pressure is expected unless oil supplies are interrupted by political or technical accidents.

Post 1985 Developments in the Oil Market

Uncertainties multiply when analysing the longer-term world oil outlook. Nobody knows what to expect of long-term economic growth rates in the industrial and developing countries. There is too little knowledge of long-term price elasticities to determine how much additional conservation can be expected in the years to come based on today's oil prices. In the longer run there are also numerous uncertainties on oil and for production prospects, the future of nuclear power, coal use, prospects for renewable energy sources, and the future of synthetic fuels. Moreover, the outlook for economic developments and subsequent energy and oil demand in the developing countries in the 1980s and 1990s is very uncertain.

Assuming further slight reduction in the real price of oil until the mid 1980s and stable to slightly increasing real prices thereafter, IEA analysis indicates that oil consumption in the industrial countries could remain virtually unchanged from current levels in the 1980s or increase gradually again to about the 1981 level by the end of the decade. In both cases, however, substantial additional conservation and further progress in fuel switching is assumed. Under economic growth assumptions of 4-5 percent per year in the developing countries, oil demand for that group as a whole could be some 50-75 percent higher by the early 1990s.

Hence, assuming modest economic growth in industrial and developing countries from 1983 onward, free world oil demand could rise to between 50 and 55 mbd by 1990. This compares with 49.5 mbd in 1980.

On the supply side, IEA analyses suggest that OECD oil production will peak again by the mid 1980s and decline thereafter. The degree of the production decline remains uncertain, but most oil industry analysts expect both U.S. and U.K. oil production to decline between the mid 1980s and the early 1990s. For the OECD as a whole, this could mean that after a number of years of decline, imported oil could be on the rise again during the second half of the 1980s.

Substantial growth in oil production is projected for the non-OPEC developing countries, and much of the incremental production is expected to come from Mexico. Egypt, Argentina, Malaysia, Brunei, Zambia and a number of West African countries are also expected to increase output. Overall non-OPEC developing countries' oil production is projected to rise from about 5.3 mbd in 1980 to between 8 and 11 mbd by 1990.

Exports from the Centrally Planned Economies, which are currently still running at about 1 mbd (net exports) are expected to decline to a negligible volume by the mid 1980s and to disappear thereafter. In fact, it cannot be entirely excluded that Comecon could become a small net importer of oil after the mid 1980s.

Hence, demand for OPEC oil, which was down to 23.5 mbd in 1981 could rise again to between 27 and 31 mbd by the early 1990s. While OPEC's maximum sustainable production is projected to remain slightly above the high end of the range shown here, world demand for OPEC oil at this level means that the world once again will become vulnerable to even relatively small supply interruptions.

The U.S. Situation

Recent IEA analysis of U.S. long-term oil demand indicates that depending on economic growth rates, oil price assumptions, the extent of additional conservation, natural gas pricing and output, and future developments in the electricity sector, U.S. oil demand in 1990 could range anywhere between 14.5 and 17.5 mbd.

While U.S. oil and NGL production has been kept at about 10 mbd for the last few years, most industry sources project production to decline in the 1980s. Current oil industry forecasts of U.S. oil and NGL production 1990 range from about 7 to 9.5 mbd (including syn fuels).

Hence, oil imports could be as low as 5 mbd in the most optimistic case and as high as 10.5 mbd in the most pessimistic case. The likely level of imports will probably fall somewhere in between this range.

Oil imports in 1981 and 1982 are unusually low due to the recession, the impact of prices on demand, consumer behaviour, fuel switching, stockdraw, and high oil output.

While one cannot exclude the possibility that oil imports will remain at about one third of consumption, the uncertainties on both the demand and supply side of the equation are such that it would not be prudent to plan on the basis of a best possible case.

The Danger of Complacency

Oil imports into the OECD countries have been reduced substantially since 1979 even if one excludes the unusual circumstances affecting the 1982 outlook.

A gradual erosion of world oil prices will have a positive impact on economic growth. On the other hand, lower real oil prices are likely to reduce the conservation effort. While the car industry will not return to making the "gas-guzzlers" of the early 1970s, consumers may opt for the larger rather than the smaller available cars in the future. There is already some indication in that direction.

There appears to be some reluctance on the side of potential buyers of the new energy-efficient series of aircraft expected to be on the market in the next few years. While part of the reason is the financial plight of the airlines, some airlines are arguing that the principal reason for early retirement of older aircraft was the high energy cost. If oil prices continue to soften, airlines may want to hold on a little longer to the older less energy-efficient aircraft.

For several reasons, including the financial plight of many U.S. electric utilities, there have been many cancellations of new nuclear power plants in recent years. While there seems to be adequate electric spare capacity in most of the country, we should not forget that it takes up to 12 years for an initial-to-final licence for new nuclear power plants.

The current outlook for natural gas production in the U.S. is uncertain at best. If output declines, prices after decontrol could rise to the extent that some industrial users of gas may once again find it attractive to return to cheaper heavy fuel oil.

Only a few years ago the oil industry was generally fairly optimistic about the future of synthetic fuels. The climate for the synfuels industry appears to have changed abruptly recently due to reassessment of production costs, energy and oil demand, and the general climate for synfuel development.

While current indications suggest that in the absence of a major oil supply interruption, the world oil market will remain balanced for the next few years, IEA assessments of long-term energy trends suggest a growing tightening of the world oil market towards the latter part of the 1980s.

One of the reasons for the soft oil market of the early 1980s is the rapid growth of non-oil energy supplies based on investment decisions made in the mid-1970s. If the industrial countries allow investments in non-oil energy supplies as well as in indigenous oil production to slip in the years to come, they could once again be faced with an oil shock in the future.

Since the early 1960s there have been more than a dozen oil supply interruptions and in the 1970s we have been faced with three major interruptions. The free world will continue to be highly dependent on Middle East oil for many years to come, and recent developments in that region should caution us against too much optimism in times of low oil demand.

The **Chairman**. Thank you very much, Dr. Franssen, for an excellent statement. I appreciate the difficulty of making forecasts, and I appreciate the candor with which you express the doubts of our ability to make precise estimates.

I do note on page 13 of your prepared testimony that you indicate that the demand for OPEC oil is expected to grow to 23 million barrels per day in 1983. If OPEC maintains its production agreement which is now at 17½ million barrels a day, what will happen to oil prices in 1983 if demand for OPEC oil grows to 23 million barrels per day?

Dr. **Franssen**. I would believe, Mr. Chairman, that when demand picks up which I think it is likely to be toward the end of this year, that they will readjust their quotas because as you know. Many of the producing countries are having very serious budgetary problems. We are not the only ones facing budgetary problems. They are facing also very serious foreign exchange problems. Nigeria is a good example, but it is not the only one. Venezuela, Indonesia, Equador also does, so I think as soon as there is some leverage there that they will come up with a new agreement and allow new increases in production. But what is likely to happen if they succeed, we still don't know whether they will succeed, but if they succeed to get through this period, it will be very difficult over the next 3 to 6 months, then spot prices are likely to firm up in the direction of OPEC prices while one would argue that on a purely logically basis, I don't know exactly what is going to happen; but it would be logical to expect that prices would adjust again in the direction of OPEC prices, and you would move away from the two-tier pricing system.

What I would then expect is that these nominal prices would continue to hold for another year; in other words, no increase in the price in nominal terms with the further drop in the real price of oil.

The **Chairman**. I understand that Norway has substantial reserves of natural gas in the North Sea, reserves which may be as large as the volumes of gas that will be provided by the Siberian gas pipeline. If that is the case, why did Europe look to the Soviet Union rather than to the Norwegian reserves for the gas supplies?

Dr. **Franssen**. I think, Mr. Chairman, it is largely a method of timing that the vast Norwegian gas reserves are in the 31 block which is in very deep waters, and the industry currently does not have the technology to produce that oil. They can drill exploration wells, but they cannot develop it.

An additional problem is that there is a thin ring of oil around that gigantic gas field which they will have great difficulty at current prices to produce, so the rate of uncertainty by the timing of it, it will probably not be developed until the mid-1990's.

The **Chairman**. Did the Norwegians indicate the same reluctance to develop an export of natural gas that they have with respect to development of oil? They have been very deliberate in the expansion of their oil production capacity. Is that equally true of their production and export of natural gas?

Dr. **Franssen**. They are planning on increasing their natural gas exports. They are currently developing gasoline facilities for a number of fields, of oil-producing fields, and that will come on stream in 1986, and that much of the gas has already been sold to Germany and other European countries, but there is really gigantic gas fields that they found in the 31 block which just for technical reasons we cannot expect to come on stream until the mid-1990's.

There is also a pricing issue. The Soviets have been very intelligent in pricing their gas more competitively than anybody else. Soviet gas delivered at the German border is I think somewhere around 50 to 75 cents per million Btu's below the Norwegian gas delivered to the German border, and it is at least a dollar per million Btu's below the price of Algerian gas, so in that sense commercially the gas was priced attractively.

Over and above that in Europe, particularly in Germany where economies are very depressed, it is seen as an overall economic deal where German companies can supply the pipe and the pumping stations and keep their people working. It is considered to be more than just gasoline. It is considered to be an overall economic project that they seem to consider attractive.

The **Chairman**. You have indicated that you expect that the centrally planned economies will become zero exporters and probably marginal importers of oil supplies in the late 1980's, from the mid to late 1980's. What will be the net energy import, export when you consider exports of natural gas and imports of other fuels?

Dr. **Franssen**. I believe that the net energy balance with the free world will remain fairly unchanged. In other words, if as I believe oil exports will gradually decline through the mid-1980's and then go down to practically zero net imports——

The **Chairman**. If they become a net importer of oil, won't that put pressure on their pricing of the exports of gas?

Dr. **Franssen**. It certainly would, but the gas, of course, will have to be priced competitively for Germans and others to buy it, and they are now locked into, of course, a kind of a 30-year contract in which they have to supply the gas at the agreed-upon price which is based on a certain formula taking into account crude oil prices and an escalation clause that is related to crude oil prices and to inflation.

The **Chairman**. If the United States were to increase its purchases for the strategic petroleum reserve by the amount of 100,000 to 200,000 barrels a day increase over the current level of purchase, would that have an effect upon the oil market today?

Dr. **Franssen**. I don't think so, Senator; in the current oil market that it would not have.

The **Chairman**. I might just note you made reference to the reports by our Government about past disruptions of oil production, and it is interesting to note that over the period of time from 1951 through the current date, there are only three of those events that were not related to Middle Eastern political turmoil which would indicate that perhaps there is a relatively high probability of that happening again.

Senator Bradley?

Senator **Bradley**. No questions, Mr. Chairman.

The **Chairman**. Thank you very much, Dr. Franssen. I very much appreciate your testimony and your appearance here today.

Dr. **Franssen**. Thank you, Mr. Chairman.

The CHAIRMAN. We now have a panel of Dr. John Lichtblau, president, Petroleum Industry Research Foundation; Dr. Larry Goldmuntz, president, Economics and Science Planning; Dr. Ted Eck, chief economist, Standard Oil of Indiana; and Dr. Melvin A. Conant, president, Conant & Associates.

You gentlemen are not strangers before this committee. Dr. Lichtblau, you may proceed. I might just note at the outset that your prepared statements will be placed in the record in full. You are at liberty to present those statements as written or to summarize extemporaneously as you see fit.

STATEMENT OF DR. JOHN H. LICHTBLAU, PRESIDENT, PETROLEUM INDUSTRY RESEARCH FOUNDATION, INC.

Dr. LICHTBLAU. Thank you very much, Mr. Chairman, and thank you for inviting me to address your committee on the near-term world petroleum outlook.

I think it is certainly appropriate for the committee to inquire into this subject at this time. The world oil market is currently in the process of unprecedented drastic changes. We are actually witnesses to another oil shock. Only this time it is the producers, not the consumers, who are experiencing the pain of the impact.

World oil production—I am excluding the Soviet bloc and China—peaked in 1979 at 51½ million barrels a day and has declined in every year since then. In 1982 it is likely to be down to about 43 million barrels a day, a drop of 16½ percent over a 3-year period. There has been nothing like it in the entire postwar period. The only other extended world production drop occurred after the first OPEC oil explosion. It lasted 2 years, during which production dropped by 9 percent and then started to resume again at a fairly rapid rate.

The shock of the decline has fallen primarily on OPEC which has borne all of it while non-OPEC production collectively has increased steadily since 1979. This year we estimate total OPEC crude and NGL production to average about 21 million barrels a day which is a drop of over 10 million barrels a day from the 1979 level.

Meanwhile, non-OPEC production is estimated to amount to about 21.5 to 22 million barrels a day which is an increase of about 2 million over 1979.

The reasons for the world production drop are known. They consist of three factors—structural decline in demand due to price-induced oil conservation and substitution; cyclical decline in demand due to the general worldwide economic recession; and global petroleum inventory unloading on an unprecedented scale due to the high cost of money, declining oil prices, and the perception among buyers of readily available new supplies.

The reason for the sharp decline in OPEC oil production and in world production is twofold. One, the physical availability of non-OPEC oil supplies increased through this period, and two, OPEC and non-OPEC producers pursued different marketing policies, particularly recently. OPEC's policy has been price oriented while that of most other producers has been volume oriented. Thus OPEC currently maintains a substantially higher price structure than its non-OPEC competitors but has lost substantial volumes to the latter. Most of them are now producing at or near capacity.

The bottom line of all this is that the average f.o.b. world oil price has dropped from a peak of $35.60 in March 1981, to about $33 today. Similarly, the crude oil acquisition cost of U.S. refiners has dropped from $37.50 to $33 in March of 1982, which is a decline of 12 percent. The sharper decline in the U.S. refiner cost than in the world price reflects the fact that domestic crude prices dropped more than foreign prices in the last 12 months. In the previous 12 months, U.S. refiner crude cost increased by 39 percent.

The price decline like the demand drop is unique in the recent history of oil price movement. Certainly since the late 1960's nominal oil prices in the United States and abroad have only moved upward. Will the trend that I have just described continue in the near future? I do not think so. I believe that the production, demand, and price declines have all about reached the bottom. They are likely to stay there for a while after which production and demand will start rising again and prices will strengthen somewhat.

Underlying this prediction is our assumption that two of the factors causing the recent production drop, the recession and the inventory reduction, have about run their course. A recession is by definition the downward phase of a business cycle. A turnaround is part of the same cycle. A growing number of economists are now predicting the turnaround in the current cycle for the second half of this year both in the United States and abroad. Majority views of the economists are a rather weak forecasting tool, but some of the signs they claim to see are quite real.

Foremost among these is the impressive decline in the inflation rate brought about by the drop in oil prices. The end of the inventory reduction can be expected some time in the third quarter. There are indications that during the first quarter of this year world oil inventories were reduced about 4 million barrels a day. Dr. Franssen mentioned exactly the same figure which we came up with independently, which is about 1½ to 2 million barrels a day more than you might consider normal.

If this is correct, inventories at the beginning of the second quarter were some 600 million barrels below the year ago. Given the decline in demand and the new, much lower perception of the desired level of oil stocks, we are likely to see a further inventory reduction in the second quarter, but if we are right in our assumption that the demand decline will turn around in the fall, the same will be true of inventory movements. Hence in the third-quarter stocks are likely to be built up again for the seasonal winter drawdown. A key factor in all of this is, of course, OPEC's willingness and ability not to exceed the 17½ million barrel a day collective production ceiling agreed to at their recent meeting in Vienna.

In the 5 weeks since the meeting, the OPEC production has actually been below it. We know that Nigeria has been producing less than its assigned ceiling in April. The same is apparently true of Iraq since its pipelines to Syria have been closed by the Syrian Government. Iraq's underproduction may be offset by Iran's ability and announced decision to exceed the ceiling assigned to it in

Vienna by OPEC, but for a variety of reasons, the Iranians are unlikely to exceed it by very much.

Meanwhile, Saudi Arabia may possibly be producing some 500,000 barrels a day less than its 7-million-barrel-a-day ceiling. Whatever the exact level, OPEC's current production is less than the world would require if it were not for the inventory reduction. Thus once this reduction is completed, the demand for OPEC oil is bound to rise by several million barrels a day. We expect this to occur in the fourth quarter of this year at the latest.

Beyond 1982, we see world oil demand recovering at a modest but steady rate from the decline of the last 3 years partly as a result of general economic growth, and partly because of the absence of real oil price increases.

By 1985, demand may amount to 49½–50 million barrels a day. It should be equal to the level reached in 1977. OPEC would share to some extent in this increase. It may be required to produce 24 million barrels a day of crude in 1985. This will be a substantial increase from the current year, but would still be way below its annual production level during the period 1972, 1980 which fluctuated between 31 and 27 million barrels a day, thus throughout this period OPEC will have substantial collective excess-producing capacity. Prior to 1981, this was generally not the case.

What will this do to OPEC's ability to set world oil prices or more broadly, can OPEC survive as an effective cartel in the market atmosphere of the next several years? I think within the timeframe of the first half of the 1980's, the period under discussion here, our answer would be yes, with some qualifications.

During this period, OPEC will, of course, be very different from what it was during the 1970's. The shock effect of the impact of the price increases and oil demand together with the increasing role of non-OPEC suppliers and OPEC's own substantial excess-producing capacity have clearly reduced OPEC's ability to determine prices, and this will continue to be the case. Most OPEC ministers have recognized this. In fact, several have acknowledged OPEC's pricing policy itself for the period 1979–80 was a principal reason for the dramatic decline in the organization's oil exports during the last 12 months. Thus, for the time being, OPEC appears to have lost the ability to raise prices at will as it could in the previous period, but it has probably retained its ability to protect the existing floor price level.

We, therefore, expect OPEC oil contract prices to remain approximately at their present nominal level this year and next and increase somewhat but probably less than inflation in 1984 and 1985. In our view, this price path will be an indication of OPEC's continued strength as a price-setting cartel, for the present world oil price is substantially above the level which would prevail under real free market conditions. The often quoted figure of $20 a barrel under the later scenario seems reasonable at least in the short run, so OPEC has been able to keep the price some 60 to 70 percent above this level in the face of a unique combination of market forces trying to depress it.

Our price and volume assumption, OPEC's collective current account surplus, would probably disappear by next year. However, the group's oil export earnings in 1983 with no change in prices are likely to amount to some $250 billion. This would be a 28-percent increase over the group's earnings in 1979 when most members registered a significant account surplus. Thus after adjustment for inflation, OPEC's foreign exchange earnings may not be less than their requirements were in 1979 which was a year of substantial economic growth for all of the members. Of course, if there is no growth in real oil export earnings, most OPEC countries will have to scale back their economic expectations and development plans, but the predictions by some analysts that OPEC will fall apart as has been quoted because some of its members will undermine its collective price policy under the pressure of short-term foreign exchange requirements does not seem to be borne out by these calculations.

The country currently most vulnerable to this type of pressure is Nigeria. Nigeria's willingness or unwillingness to abide by its OPEC assigned quota under current conditions may be a test case of OPEC's solidarity under extreme conditions. Clearly Saudi Arabia whose power and influence in matters of oil policy is awesome is taking some unusual steps to strengthen Nigeria's determination to stay with OPEC.

In concluding, I would like to say that all my comments assume, of course, no major military or political disruption of the oil flow from the Persian Gulf. This standard disclaimer could become more important than all my other comments if Saudi Arabia should become directly involved in or affected by some of these ominous military, political, religious developments in the region. Thus we are by no means home free in regard to our dependence on foreign oil, whatever OPEC's official price policy may be.

Thus such actions as accelerating our SPR fill rate or having an emergency plan ready in case of another interruption would seem highly desirable.

Thank you very much.

[The prepared statement of Dr. Lichtblau follows:]

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Statement before the
Committee On Energy and Natural Resources
of the
United States Senate

The World Petroleum Outlook

by

John H. Lichtblau
President

April 23, 1982

Thank you for inviting me to address your Committee on the near term world petroleum outlook. It is certainly appropriate for the Committee to inquire into this subject at the present time. The world oil market is currently in the process of unprecedented drastic changes. We are actually witnessing another oil shock. Only this time it is the producers, not the consumers, who are experiencing the pain of the impact. World oil production (excluding the Soviet Bloc and China) peaked in 1979 at 51.4 million B/D and has declined in every year since then. In 1982 it is likely to be down to about 43 million B/D, a drop of 16.5% over a three year period. There has been nothing like it in the post war period. The only other extended world production drop occurred after the first OPEC oil price explosion. It lasted for two years (1974-75), during which production dropped by 9% before resuming its upward climb.

The shock of the decline has fallen primarily on OPEC which has borne all of it while non-OPEC production collectively has increased steadily since 1979. This year we estimate total OPEC crude and NGL production to average about 21 million B/D, a drop of over 10 million B/D from the 1979 level. Meanwhile, non-OPEC production is estimated to amount to 21.5-22.0 million B/D, an increase of about 2 million B/D over 1979.

The reasons for the world production drop are known. They consist of three factors: structural decline in demand due to price-induced oil conservation and substitution; cyclical decline in demand due to the general worldwide economic recession; and global petroleum inventory unloading on an unprecedented scale, due to the high cost of money, declining oil prices and the perception among buyers of readily available new supplies.

The reason for the sharper decline in OPEC oil production than in world production is twofold: 1) the physical availability of non-OPEC oil supplies increased throughout this period, and 2) OPEC and non-OPEC producers pursued different policies, particularly in the last six months. OPEC's policy was price-oriented, while that of most other producers was volume-oriented. Thus, OPEC currently maintains a substantially higher price structure than its non-OPEC competitors, but has lost substantial volume to the latter, most of whom are producing at or near capacity.

The bottom line of all this is that the average f.o.b. world oil price has dropped from a peak of $35.60*/Bbl in March 1981 to an estimated $33.00 today. Similarly, the crude oil acquisition cost of U.S. refiners has dropped from its March 1981 peak of $37.48 to an estimated $33 in March 82, a decline of12%. The sharper decline in the U.S. refiner cost than in the world price reflects the fact that domestic crude prices dropped more than foreign prices in the last 12 months. In the previous 12 months U.S. refiner crude cost had increased by about 39%.

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*EIA, Weekly Petroleum Status Report, April 3, 1981.

The price decline, like the demand drop, is unique in the recent history of oil price movements. Certainly since the late 1960's,nominal oil prices, both in the U.S. and abroad, have only moved upwards.

Will the trends that I have just described continue in the near future? I do not think so. I believe the production, demand and price declines have all about reached bottom. They are likely to stay there for a while after which production and demand will start rising again and prices will strengthen somewhat. Underlying this prediction is our assumption that two of the factors causing the recent production drop -- recession and inventory reduction -- have about run their course. A recession is by definition the downward phase of a business cycle. A turn-around is part of the same cycle. A growing number of economists are now predicting the turn-around in the current cycle for the second half of this year, both in the U.S. and Europe. I am aware, or course, that majority views of economists are a rather weak forecasting tool but some of the signs they claim to see are quite real. Foremost among these is the impressive decline in the inflation rate, brought about in part by the drop in oil prices.

The end of the inventory reduction can be expected sometime in the third quarter. There are indications that during the first quarter of this year world oil inventories were reduced by about 4 million B/D, or 1.5-2.0 million B/D more than is normal. If this is correct, inventories at the beginning of the second quarter were some 600 million Bbls below the year-ago level. Given the declining demand and the new, much lower perception of the desired level of oil stocks, we are likely to see a further inventory reduction in the second quarter. But if we are right in our assumption that the demand decline will turn around in fall, the same will be true of inventory movements. Hence, in the third quarter stocks are likely to be built up again for the seasonal winter drawdown.

A key factor in all this is of course OPEC's willingness and/or ability not to exceed the 17.5 million B/D collective production ceiling agreed to at its recent meeting in Vienna. In the 5 weeks since the meeting it appears that OPEC production has actually been below it. We know that Nigeria has been producing less than its assigned ceiling in April. The same is apparently true of Iraq since its pipelines through Syria have been closed by the Syrian government a few weeks ago. Iraq's under-production may be offset by Iran's ability and announced decision to exceed its ceiling. But for a variety of reasons the Iranians are unlikely to exceed it by very much. Meanwhile, Saudi Arabia may possibly be producing some 500,000 B/D less than its 7 million B/D ceiling.

Whatever the exact level, OPEC's current production is less than the world would require if it were not for the inventory reduction. Thus, once this reduction is completed, the demand for OPEC oil is bound to rise by several million B/D. We expect this to occur in the fourth quarter of this year at the latest.

Beyond 1982 we see world oil demand recovering at a modest but steady rate from the decline of the last three years, partly as a result of general economic growth and partly because of the absence of real oil price increases (of which more later). By 1985 demand may amount to 49.5-50.0 million B/D which would be equal to the level reached in 1977. OPEC would share to some extent in this increase. It may be required to produce 24 million B/D of crude in 1985. This would be a substantial increase from the current year but would still be way below its annual production level during the period 1972-80 which fluctuated between 31 and 27 million B/D. Thus, throughout this period OPEC will have substantial collective excess producing capacity. Prior to 1981 this was generally not the case.

What will this do to OPEC's ability to set world oil prices? Or more broadly, can OPEC survive as an effective cartel in the market atmosphere of the next several years? Within the time frame of the first half of the 1980's, the period under discussion here, our answer would be _yes_, with some qualifications. During this period OPEC will of course be very different from what it was during the 1970's. The aforementioned shock effect of the impact of the price increases on oil demand, together with the increasing role of non-OPEC suppliers and OPEC's own substantial excess producing capacity have clearly reduced

OPEC's ability to determine prices and this will continue to be the case. Most OPEC oil ministers have recognized this. In fact, several have acknowledged that OPEC's pricing policy of the period 1979-80 was largely responsible for the dramatic decline in the organization's oil exports during the last 12 months.

Thus, for the time being, OPEC appears to have lost its ability to raise prices at will, as it could in the previous period, but it has probably retained its ability to protect its existing floor price level. We therefore expect OPEC contract prices to remain approximately at their present nominal level this year and next and increase somewhat (but no more, and perhaps less, than inflation) in 1984 and 1985.

In our view, this price path would be an indication of OPEC's continued strength as a price setting cartel. For the present world oil price is substantially above the level which would prevail under real free market conditions. The often quoted figure of $20/Bbl under this latter scenario seems reasonable, at least in the short run. OPEC has been able to keep the price some 60-70% above this level, in the face of a unique combination of market forces trying to depress it.

Under our price and volume assumption, OPEC's collective Current Account surplus would probably disappear by next year. However, the group's oil export earnings in 1983, with no change in prices, are likely to amount to about $250 billion. This would be a 28% increase over the $195 billion the group earned in 1979 when most members registered a significant Current Account surplus. Thus, after adjustment for inflation, OPEC's foreign exchange earnings may not be less than their requirements in 1979, a year of substantial economic growth for all OPEC members.

Of course, if there is no growth in real oil export earnings, most OPEC countries will have to scale back their economic expectations and development plans. But the predictions by some analysts that OPEC will "fall apart" because some of its members will undermine its collective price policy under the pressure of short term foreign exchange requirements, does not seem to be borne out by our calculations.

The country currently most vulnerable to this type of pressure is Nigeria. Nigeria's willingness or unwillingness to abide by its OPEC assigned quota under current conditions may be a test case of OPEC solidarity under extreme conditions. Clearly, Saudi Arabia, whose power and influence in matters of oil policy is awesome, is taking some unusual steps to strengthen Nigeria's determination to stay with OPEC.

In concluding I would like to say that all my comments assume of course no major military or political disruption of the oil flow from the Persian Gulf. This standard disclaimer could become more important than all my other comments if Saudi Arabia should become directly involved in, or affected by, some of the ominous military-political-religious developments in the region.

Thus, we are by no means home free in regards to our dependency on foreign oil, whatever OPEC's official price policy may be.

The **Chairman**. Thank you very much, Doctor. Dr. Goldmuntz?

Dr. **Goldmuntz**. Thank you very much, Mr. Chairman, for inviting me to appear before you. It is a pleasure to be here.

I have some written testimony which at your pleasure will be submitted for printing.

The **Chairman**. It will be placed in the record in full. You may summarize or highlight.

STATEMENT OF DR. LAWRENCE A. GOLDMUNTZ, PRESIDENT, ECONOMICS AND SCIENCE PLANNING

Dr. **Goldmuntz**. I would like to highlight for just a few moments if I may.

First of all, I feel very sympathetic for the chairman and members of the Senate committee who invite speakers from all over the world and they appear before you and they say on the one hand, but on the other hand, and I don't know how you synthesize those two views, but that is the reality of this situation.

I think the experts that you have heard and the ones that you will hear are realistically describing the situation. We could have peace in the Middle East, tranquility in that part of the world. We could possibly have fuel switching and conservation in our domestic economy, demand go down, supply up. Prices would come down. This would be a marvelous scenario, and it may happen. It also may not happen. As you know right now Syria is not allowing exports from Iraq. Iraq's production which was to be 2.3 million barrels a day at this time is now down to something of the order of 700,000. That might be the most benign of the scenarios that could happen in that part of the world in which case prices would skyrocket.

It seems to me the most important part of this hearing might be addressed to the issue what do we do? How do we address these two scenarios? How do you make U.S. international energy policy address both the optimistic scenario and the pessimistic scenario in the international domain because both may happen, and it is beyond our control to determine how they will happen in many ways, so what I would like to suggest is this.

There are three words essentially that cover what I would think would be a robust U.S. international energy policy. They are strategic petroleum reserve, essentially reserves, tariffs, and proliferation. Those should be the three legs in the stool of U.S. international policy that might be stable.

Obviously you have heard a great deal about the strategic petroleum reserve today. I think it should be expanded, continued to take advantage of the price cuts and build it up.

The second thing is I think we should put a tariff on imported oil. The reason for that is that is the only way we will recognize the hazards which we have all identified this morning and will continue to identify of importing oil. There is a real cost to imported oil—the national security and the economy of this country—and we ought to recognize it. Only by putting a tariff on will we be able to make that cost palpable and continue conservation and fuel switching efforts within the United States and continue to decrease our demand.

The third role that I would like to talk about is the possibility for enhancing our supply of oil from those parts of the world that are not now our major suppliers. The previous administration did support a World Bank facility to accomplish just that. This administration backed off that support. I happen to think that was a mistake and that issue should be reexamined at this point in time.

We also have institutions within our own Government—one is called the Overseas Private Investment Corporation—that are supposed to promote that sort of activity. I happen to have before me their 1981 annual report, and if you look at their curve, where they operate, you will see that there is a large green area where presumably they can operate, and you will notice that some of those green areas are in South America where there is a great oil resource, and presumably located in the strategic sense in our interest.

The fact of the matter is that OPEC cannot operate in a single country in South America because of a variety of circumstances which they don't identify in this report, but which should be identified. They cannot operate in countries that violate human rights. That has caused problems for Argentina, countries that are members of OPEC, so they can't operate in Venezuela, and they can't operate in countries that subscribe to the Calvo doctrine. That doctrine says you can't be sued except in your own country. Therefore, they can't operate in the Andian countries. When you sum it all up, OPIC cannot provide the services they were designed to provide, and part of the world is extremely important for the United States with respect to prospective increased oil horizons.

Now I would suggest that this Government examine the restrictions on OPIC, whether they are statutory or bureaucratic and see whether they can't be removed in the interest of oil proliferation, but perhaps the problem ought to be examined even more generally. You know that we do have an agreement with Mexico, and I believe it calls for filling the Strategic Petroleum Reserve with Mexican oil at the rate of 50,000 barrels a day up until 1986, assuming oil supply, assuming money is appropriated for that purpose.

It would seem to me there are a number of marginal suppliers of heavy oil in Venezuela, and other parts of the world, that might come on stream if they had some inducement of a long-term lifting agreement from the United States particularly to fill the Strategic Petroleum Reserve. I therefore think the issue of oil proliferation and the role of the U. S. Government in oil proliferation should be examined carefully and some recommendations should be made at least to clean up the act that we now have and perhaps to expand it.

Thank you very much, Mr. Chairman.

[The prepared statement of Dr. Goldmuntz follows.]

Testimony of Dr. Lawrence A. Goldmuntz
Before Senate Committee on Energy
and Natural Resources
April 23, 1982
World Petroleum Outlook

U.S. Policy should accommodate to the reality that important components of the world's petroleum supply are located in volatile parts of the world. The supply from these regions is unpredictable. Therefore, the world petroleum outlook is uncertain. While our dependence on volatile suppliers has decreased in the last four years, it is still large. In 1979, 20 million barrels per day were shipped thru the Gulf of Hormuz. That number has been reduced to approximately 10 million barrels today. However, this is still 25% of free world petroleum production. Should there be a major interruption of supplies from the Middle East with a total or near total cut-off at the Straits of Hormuz, oil prices would skyrocket.

A more optimistic scenario would be based on some tranquility in the Middle East, an increasing oil supply from those countries that need funds, Mexico, Iran, Iraq, Great Britain, Venezuela and Nigeria, for example, and for a continuation of conservation and fuel switching from oil and therefore a moderating demand. Under this scenario prices would continue to decline. It might be useful to spend a few moments on each scenario.

The optimistic scenario assumes that Iran and Iraq can each increase their deliveries by one million barrels per day from their September 1981 production. This is their announced intention. The optimistic scenario also assumes that the remaining OPEC non-discretionary producers, (those that need money) Nigeria, Venezuela, Indonesia and Algeria return to the production levels they achieved in January of 1980. This would lead to a total of 11 million barrels per day for OPEC non-discretionary producers. This is shown in the Table attached to this testimony.

This scenario also assumes that non-OPEC oil production will increase by 1983 to 20.6 million barrels per day from 18.8 million barrels per day in September of 1981. This increase will come primarily from Mexico, the North Sea, Egypt and Canada. The scenario also predicts a continuation of conservation and fuel switching from oil at one half the 5% rate of the past two years. It also assumes an increase in oil consumption at the rate of one half of the increase in GNP of oil importing countries, which is assumed to average 3.5% per year. Under these conditions - reasonable for a peaceful world - the remaining demand from the discretionary OPEC oil producers in the Persian Gulf (those states that do not need money) would decrease to 7.2 million barrels per day from the 12.8 barrel per day level in September at 1981. The oil requirement from these states would decrease even more dramatically by 1987 - 1990 assuming some reasonable extrapolation of the previous trends and that some new horizons come on stream. There are possibilities for such new horizons off Newfoundland, Argentina, West Africa, China, Vietnam and The Beaufort Sea.

Of course the discretionary oil producers in the Persian Gulf would not permit their market share to decrease so substantially. To maintain market share, they would discourage the development of new oil producing horizons, fuel switching and conservation, by lowering price. They can afford to do this, since they have the lowest production costs in the world, less than 5% of their selling price. This would be a happy event for the oil importing nations as long as they did not repeat the mistakes of the last two decades. The oil importers must take out insurance against the disruption of oil supplies and their victimization by cartel arrangements.

The unhappy scenario - total or partial cut-off of supply from the Middle East has occurred in the past, is occurring partially now and will continue to occur. Syria is preventing Iraqi exports to the Mediterranean. Iran is preventing them through the Persian Gulf. Iran would probably not permit Kuwait or Saudi Arabia to handle

Iraqi oil even if pipelines were built to ship Iraqi oil thru Kuwaiti or Saudi terminals. Kuwait and Saudi Arabia would undoubtedly not provoke Iran by even attempting to ship Iraqi oil

Thus Iraq is limited to exports of only 700,000 barrels per day through a Turkish pipeline. This is 1.6 million barrels per day less than Iraq's plans. There are endless scenarios for making this situtaion worse.

A robust U.S. international energy policy could respond to both the optimistic and pessimistic perception of the world petroleum outlook. Such a policy would have both short-term and long-term components. I would suggest it consists of the following elements:

1. An expanded strategic petroleum reserve to counteract supply disruptions

2. A tariff on imported oil to maintain domestic fuel switching and conservation efforts reducing demand on the international market. (In economic terms recognizing the full costs of the hazards of imported oil.) The tariff can be increased during oil cut-offs to match demand to available supply.

3. A federal role or support for a multilateral institution to promote oil proliferation. The "correct" world capacity for oil production based on economic criteria is undoubtedly less than the "correct" world capacity for oil production based on national security interests. The private sector is not and should not be responsible for national security interests. This federal role could make the form of bilateral long-term purchase agreements to bring on marginal capacity in areas that serve our strategic interests. Such purchases could be used in part to fill the strategic petroleum reserve.

The federal Overseas Private Investment Corporation - designed to minimize the political risks of overseas investment - cannot operate in South America because of limitations placed on it by statute and bureaucratic procedure. But this is precisely where there are substantial oil horizons. These limitations on OPIC inhibit oil proliferation. These limitations should be reviewed and hopefully removed.

In brief, a robust international energy policy should include oil storage, tariffs and proliferation.

Table G

An Impossible (?) Supply/Demand Balance
(Million Barrels per Day)

Time frame	Libya and Persian Gulf (discretionary)	Other OPEC (non-discretionary)	Non-OPEC	Potential new horizons (OPEC & Non-OPEC)	Conservation(1) or fuel switching	Increase(2) in demand
1981 (September)	12.8	7.8	18.8			
1982-83	7.2	11.0(3)	20.6		2	1.4
1986-87	1.0	13.3(4)	20.	3.5(5)	6	4.4

(1) More than 5 percent/year for 1980-1981, but assumes 2-1/2 percent/year for 1982-1987

(2) Assumes 3.5 percent/year GNP, half growth in oil demand/growth in GNP

(3) Assuming Iran and Iraq achieve their announced increases in oil production in 1982

(4) Assuming some moderation in Iran/Iraq war so that they return to January 1980 production levels

(5) Assumes fifty percent of the 1990 potential in Table F is available by 1987

The Chairman. Thank you very much. Dr. Eck?

STATEMENT DR. THEODORE R. ECK, CHIEF ECONOMIST, STANDARD OIL CO. OF INDIANA

Dr. Eck. I am going to try to summarize my summary and try not to repeat what other panelists have said, maybe try to integrate that in with some general observations and indications of the strategic and economic consequences of these trends that we are observing.

I think there has been agreement of the panelists that the last 2 or 3 years have been unusual years with three events occurring simultaneously—a period of essentially zero economic growth throughout the industrialized world and unprecedented conservation and fuel substitution efforts, and finally, a massive drawdown of inventories.

Let's ask whether these conditions will persist. Certainly there has to be hope that the economies of the world will pick up some time, but the impact of this improvement may be more magnified this time than previously, and the reason for that is that the world recession is much more a smokestack industry recession this time with steel, autos, construction, chemicals; the heavy energy using industries are the ones that are operating at 50 percent of capacity and so as we pick out of this recession, presumably there will be a more than normal impact on energy and oil demand.

Persistence of the conservation/substitution behavior is somewhat more conjectural, but as the Chairman said, it is not clear that the current rate of conversion to coal and other energy sources will indeed continue. We can be absolutely certain that the rate of inventory reduction will not persist for long. Indeed we already believe that secondary stocks are down to bare minimum level.

Now secondary stocks are the stocks of the truckers and the airline companies and big industrial users and so on. There are no official Government data on these stocks, but our contact with these customers leads us to conclude that frankly, they are down to fumes in their tanks, and there is no farther down to go with these stocks.

We do have data on the refineries and terminal stocks, and these stocks have been coming down rapidly in the United States. Distillate inventories are now down to normal, and gasoline and crude oil stocks are well below last year. Also if we look at the total world rate of oil production and agree that OPEC is producing about 16 million barrels a day, if we persist at this low production rate, the world will be below normal on total crude and product stocks before September, so inevitably OPEC production must come up in order to meet winter demands.

We can conclude from that then that OPEC prorationing is working. The Saudis are willing and able to lead the assault on the so-called oil glut and are achieving this objective.

Now as inventories decline, oil prices are firming. The Saudis are holding to their $34 oil price. The spot price of crude oil around the world in recent days, the last couple of weeks, has increased roughly $3. There is no more $28 crude oil. The lowest prices being quoted for PG quality crude is around $31. It is my expectation that as we eliminate these inventories and get down to normal or even below normal inventory rates, inevitably then the difference between spot prices and contract prices will be eliminated.

Product prices will follow crude prices up. Wholesale prices are already reflecting these pressures and are increasing around the world, so very soon there will be an end of the oil glut, an end to this temporary era of cheap oil. The world will require then not 16 million barrels a day but 22 or more million barrels a day of OPEC production by the end of the year for it to meet normal inventory and demand requirements for the coming heating season.

The longer term trend of oil supply and demand and prices is also not encouraging. As world growth resumes and if oil prices are stable, I don't think there is any question that world oil demand will increase. It may well increase faster than the consensus forecast. To reflect back on the period Dr. Franssen referred to in 1975 to 1979, a period when world oil prices were flat and world economies were growing, world oil demand also increased, increased at a substantial rate. I have submitted into the written record my specific reasons for fearing that those forecasters are underestimating the level of world demand under these conditions.

U.S. oil imports are also going to increase. At present, we are importing roughly 4 million barrels a day. There is no way that we can maintain that level of imports. Imports will have to average at least 5 million barrels a day during the second half of this year, and by 1985, U.S. oil imports will be a minimum of 5 million barrels a day and perhaps as high as 6, 7, and 8, but certainly we are at an end of the period when U.S. imports were falling, and whatever benefits the reduced U.S. oil imports may have provided to reduce world crude oil prices.

It is noted that the world will require more OPEC crude oil in the 1983 to 1985 period than currently, and the estimates range from an absolute bare-bones minimum of 22 million barrels a day up to a probable 24, 25 million barrels a day imports, again far in excess of the current OPEC production rates.

These trends are not hopeful to the United States or to the rest of the world. Depleted inventories and rising U.S. and rest of the world oil import requirements, are certain to make us more vulnerable to supply interruptions and oil exporter price demands.

Now what can the United States do to minimize these risks and add to our strategic and economic security in light of these anticipated oil supply conditions? First, I fairly agree with the recommendation that we must accelerate the rate of fill of the strategic petroleum reserve. Specifically I recommend that we charter VLCC's now when there is immense world surplus of these vessels. There are far more VLCC's than could possibly be needed for transportation requirements and any reasonable level of storage. VLCC's are the cheapest form of storage available with charters available now as low as a dollar a barrel per year.

Indeed if we don't charter these vessels, they are going to be scrapped and lost to the world fleet, and we will end up paying for these tankers in the future at higher rates.

There also must be a very substantial amount of steel tankage available in the world. If indeed we have drawn down world inventory of 500 million barrels a day, there has to be 500 million barrels a day of spare tankage some place, and indeed that tankage does exist, so somehow, somewhere, we have got to find the money to increase this rate of fill in the strategic storage.

Second, we need to reconsider our synfuels programs. At a $34 oil price, and if this price were to persist in real terms, there are no present generation technologies for making synthetic crude oil or synthetic gas that are cost competitive with crude oil at this price. Therefore, it is difficult to see what public purpose would be served by building $1 billion and $2 billion demonstration plants that could convince the world that indeed it does cost $50, $60, $70, or $80 to manufacture shale or coal. It is far better to spend our money to evolve second generation technologies that might provide us the opportunity for producing synfuels at costs competitive with world market prices. In other words, we need to spend our money on research and development, not giant demonstration projects of technologies which are doomed to economic failure.

Finally, we must avoid the imposition of new tax burdens on the domestic petroleum industry, either levied on exploration and production or refining. The exploration and production sector of this business is now suffering and suffering severely from lower oil prices. Failure to achieve expected accelerated gas decontrol and profit margins are reflecting this and we believe that industry first quarter 1982 earnings will reflect these disappointing results.

Drilling activity is now already 20 percent below peak levels achieved last year. The petroleum refining sector is even in worse shape. A tax on refinery input that placed U.S. refineries at a competitive disadvantage with foreign suppliers would be disastrous. Now certainly the Congress would not intentionally tax our refineries out of business, but inevitably exemptions to favor groups such as east coast fuel users, petrochemical manufacturers, and Puerto Rican and Virgin Island refiners and so on would have this effect.

If it is absolutely necessary to impose taxes on petroleum these taxes must be levied on consumption and not directed toward domestic petroleum production or manufacturing, so in summary, the oil glut and period of falling oil prices is at an end. We are returning to the bad old days of strategic vulnerability, to OPEC oil deliveries and uncertainty about when and how rapidly world oil prices will rise.

This period will require wise leadership and a large SPR to carry us through the balance of this decade.

Thank you, Mr. Chairman.

[The prepared statement of Dr. Eck follows.]

STATEMENT OF

DR. THEODORE R. ECK

CHIEF ECONOMIST, STANDARD OIL COMPANY (INDIANA)

Mr. Chairman, Members of the Committee:

I would first like to thank you for your invitation to testify here today on the world petroleum outlook. The world oil markets have been undergoing some notable changes lately. In the eyes of the public, these changes are less dramatic than those our nation experienced in the supply disruptions of 1973-74 and 1979-80, but I believe they may be even more significant in the longer view.

We have recently seen widespread reductions in petroleum prices. A number of factors have contributed to this, but the most important element underlying the oil price decline has been the worldwide decline in petroleum demand that reflects slack economic conditions (especially in heavy, energy-intensive industries) simultaneously in North American, Western Europe and Japan. This decline in basic demand has been accompanied by a rapid liquidation of the large oil inventories at all levels that were built up following the Iranian supply disruption. The questions now before the house are, first, will this present situation continue, and second, what does it imply for the world petroleum marketplace?

During the two supply disruptions of the past decade, oil prices shot up very quickly and oil consumption fell sharply. However, during the 1975 - 79 period, free world oil demand grew by 17 per cent as oil prices remained more or less stable -- in real terms, oil prices actually declined slightly, especially in those countries whose currencies were growing in value relative to the U.S. dollar.

Should we now expect an upturn in world petroleum demand, as oil prices are again stable and even falling? My view is that there will be some upturn in petroleum demand over the next two to three years as the world economy recovers from the current recession, though it will be a very modest upturn in demand. Countering the normal pickup in energy demand during an expansion will be increasing payoffs to long-term energy conservation efforts. This is not the temporary, "crash program" type of conservation we all experienced in the supply crises of the seventies, when we dialed down our thermostats, waited patiently to buy our quota of gasoline on alternate days, and donned sweaters in response to Presidential exhortations. It is a deliberate, permanent, efficiency-oriented kind of conservation that reflects the fact that price changes affect energy demand over a long period of time -- ten years and more -- through changes in capital investment.

In technical terms, most forecasts reflect economists' estimates of the intermediate price elasticity being around -0.3, and higher long-term price elasticity. Indeed, many forecasters are now assuming that the long-term price elasticity approaches unity. In other words, a permanent, ten per cent increase in the real price of oil leading -- over a period of ten years or more -- to something approaching a ten per cent reduction in total oil usage.

Certainly one of the most impressive examples of long term conservation efforts is in vehicular transportation. Most new cars today deliver average fuel economy about twice as good as the models of just eight years ago. By 1985, new car fuel economy should improve by another 20 per cent.

Instead of dialing down and shivering, we are now building comfortable but energy-efficient homes and offices, and retrofitting existing structures with more insulation and better heating and cooling equipment. When engineers design a new industrial plant, they throw out the blueprints of the sixties and start with a clean sheet of paper. In the new plant, the design economics are optimized for costly, not cheap, energy. All of these "built-in" conservation measures are with us to stay.

I would like to add a note of caution, though, that the assumption of the long-term price elasticity approaching unity used in most forecasts may overstate the conservation effects. The observed price elasticities over the 1979-81 period were about -0.3. While short term in one sense, they may also be reflective of longer term effects since the demand changes also included the long-term effects from the oil price increases over the 1973-75 period. More importantly, there are a number of factors that suggest the commonly used long-term price elasticities may be an overestimation:

- The substantial financial incentives to reduce inventories is resulting in a rapid drawdown of secondary and tertiary oil stocks, exaggerating the reported declines in petroleum demand.
- Declining oil use in industry is making further reductions in oil usage increasingly more difficult.
- The recession has been primarily in the smokestack industries which are the large users of energy, particularly oil.
- The substantial decline in industrial production over an extended period of time has resulted in the shutting down of the least efficient plants, which generally are the biggest energy users and usually oil fired.
- The perception in recent years that rapidly increasing oil prices would continue rising at a rapid rate indefinitely, and that the world would soon be running out of oil formed a basis for oil conversion and conservation that may no longer be justified.
- Coal usage has serious pollution concerns (e.g., acid rain) and also has high capital requirements.
- The virtual demise of nuclear energy places additional demands on oil and other energy sources.
- The increasingly high cost of liquified natural gas (LNG) and other energy substitutes reduces their future energy contribution, increasing the potential demand for oil.

- o The high capital cost of conversion and conservation may cause many companies to review their plans to determine if this is the best use of their limited capital.

Nevertheless, the consensus forecast is for only very modest increases in petroleum demand in the [redacted] free world between now and the year 2000, and it is expected that U.S. oil demand will actually decline slightly. Petroleum demand among the developing countries of the "third world" will increase somewhat as their economies grow, but overall free world petroleum demand will grow at only one per cent a year. This is in dramatic contrast with the seven per cent annual growth in free world oil demand over the pre-embargo, 1960-73 period and four per cent annual growth over the 1975-79 period.

In the short-run, 1982 total free world petroleum demand will average about three percent below 1981 levels, and the prospects for 1983 are for only a very anemic recovery. Both price-induced conservation and recent economic stagnation have contributed to this decline in oil demand, but a parallel, worldwide drawdown of petroleum inventories at all levels of consumption has also been a major factor.

During the 1979-80 period, free world oil inventories were built up rapidly, and at their peak in mid-1980 primary inventories were near a billion barrels higher than average 1975-78 levels. This inventory overhang became an enormous burden with the record high interest rates of 1981, and prospects for both falling demand and falling oil prices triggered a sharp run-off beginning last fall that is still continuing. I expect that by the end of 1982, world oil inventories (including strategic inventories held by governments) will be lower than we have seen in many years, and at the point where the operating integrity of the world oil supply system would be jeopardized by further drawdowns. However, if high interest rates were to decline substantially or if oil prices were to rise appreciably, there may be less effort to reduce inventories.

On the supply side of the petroleum marketplace, it is significant to note that almost the entire brunt of recent free world demand reductions has fallen on OPEC. OPEC's percentage share of free world oil supplies actually peaked in 1976 at 64 per cent, and now is below 50 per cent. Total petroleum production in non-OPEC countries, including the U.S., has actually increased slightly, and is at or near maximum possible rates. The prospects are for non-OPEC suppliers to continue to increase their output slightly, at least for the next few years. After peaking at 31 million barrels a day (MMBD) in 1979, OPEC crude output will average only 20 MMBD this year.

Currently, OPEC is probably producing less than 17 MMBD, but this is expected to increase to close to 21 MMBD in the second half of this year as inventory liquidation tapers off and normal seasonal demand picks up. Although much of the 1979-81 decline in OPEC output reflects the drop in exports from Iran and Iraq, recent cuts are falling most heavily on Saudi Arabia.

The most noticeable manifestation of recent shifts in the world petroleum marketplace is reflected in current oil prices. The price of crude oils that are effectively free of "official" or contractual price constraints -- for example, most domestic U.S. oil and overseas crudes sold on the spot market -- have declined by some $6 a barrel over the past 12 months. The "official" price structure among OPEC crudes has also changed markedly, as the prices of some crudes that were previously over-priced have been cut, while the official Saudi Arabian price for Arab Light has gone up by $2 a barrel. This has caused some realignment of crude cost relationships among OPEC customers. Buyers with contractual access to Saudi Arabian crude have lost their earlier $3 a barrel crude cost advantage and now face a net disadvantage approaching $5 a barrel on this portion of their supply.

Speculation is intense as to which way prices will move -- and how far -- in restoring petroleum market equilibrium. However, any significant decline in oil prices would quickly lead to demand out running supply as conservation and energy alternatives to oil were abandoned and the search for non-OPEC sources of oil was throttled back. Hence, any big fall in oil price is unlikely and at most would be only temporary. Conversely, current supply and demand conditions are obviously not supportive of forecasts calling for big oil price increases in the near to intermediate term.

Any review of the petroleum outlook would be incomplete without discussing natural gas, especially in regard to the United States" situation. This Committee has, of course, been very deeply involved in the natural gas policy debate over the past year, and I don't want to rehash all of the complexities of this issue here today. Suffice to say, federal wellhead price controls are continuing to provide energy bargains to users fortunate enough to have access to these supplies, and they are also continuing to stifle prospects for the aggressive gas exploration program the United States should be undertaking.

Proven U.S. gas reserves continue to decline, and the stagnant to declining drilling picture offers poor prospects for any prompt reversal of this trend. Ironically, the potential U.S. resource base for gas is enormous. Ths U.S. Geological Survey has estimated that undiscovered, conventional U.S. gas reserves are in the order of six hundred trillion cubic feet (TCF), or roughly three times current proven reserves and versus annual U.S. consumption of 20 TCF. Studies of unconventional natural gas sources (tight sands, Devonian shales, geopressurized and coal seam gas) by the Potential Gas Agency suggest that total natural gas resources could be as much as four thousand TCF. The first step required in realizing the full potential of this great American resource is to restore free, competitive pricing to the natural gas market, and I believe I share with many of you the hope that Congress will soon act favorably in this regard.

There are some specific issues in the petroleum outlook which I would like to bring to the particular attention of this Committee. One of these is the Strategic Petroleum Reserve. The share of oil imports in our nation's total oil supply has declined to only 32 per cent in recent months, compared to a high of 52 per cent in early 1977. However, prospects are slim for this import share being reduced further -- our current forecast is for it to actually increase slightly (to 36 per cent) over the next two decades. Thus, the role of the SPR will remain absolutely critical in protecting the United States against an oil import disruption. Given this sobering prospect and the current soft crude oil market, I believe the federal government should take the opportunity to accelerate acquisition of SPR oil. I recognize that there are physical limits to the fill rate and the overall size of the present salt cavern SPR system, but I would encourage the government to utilize alternate storage capabilities.

There is a worldwide surplus of large tankers (VLCCs) available at very low cost which would provide a readily available storage increment. Also, recent refinery plant closings in the U.S. have made available substantial unused tankage. Both of these alternatives offer greater flexibility in use than salt dome storage, plus greater geographical diversity of the security risks. When the much higher recoverability is taken into consideration, the cost per barrel of recovered oil from VLCC and tank storage could compare very favorably with salt cavern storage. I would urge the Committee to give the question of accelerating the filling of the SPR their most serious consideration.

Events of recent months have also changed perceptions of the role of synthetic fuels -- synfuels -- in U.S. energy policy. In retrospect, the price and supply environment of 1979 and 1980 may have led to an overselling of synfuels. Now, with domestic crude prices at $31 a barrel and new natural gas selling at the equivalent of $17 a barrel, it is hard to drum up much interest in $50 a barrel shale oil, to say nothing of $80 a barrel liquids derived from coal. However, I would not like to see the long-term promise of synfuels forgotten now, and I hope the members of the Committee also feel that way. Clearly, though, there is not much to be gained in building full-scale, commercial plants today to demonstrate the production of $50-80 per barrel oil. However, there are many years of sustained research and development work needed to bring our technology to the point where commercial plants could be built in the next decade or two. This type of R & D is never a success when undertaken on a stop-and-go basis, and it would be tragic to now lose the momentum we have gained over the past decade. The thrust, though, should be an engineering/research mode as opposed to spending billions on full size plants.

Finally, no review of the petroleum situation would be complete without discussing the very distressing course of recent events in the U.S. oil and gas exploration industry. After two years of needed and healthy expansion, adverse price developments have triggered a very rapid fall off in seismic and drilling activity since late 1981. Each passing week is posting new declines in rotary rig activity, which is now some 20 per cent below year end 1981 levels. While much of the decline can be attributed to the decline in crude oil prices, it has been aggravated by high financing costs and dimming prospects for fast action on natural gas price decontrol.

This downturn is obviously very painful to the workers who have lost jobs and the businesses that have been idled as a result. It also threatens to derail our prospects for halting the decline in U.S. oil and gas production. It is not the job of Congress, of course, to protect the oil industry from the competitive discipline of the world marketplace. However, positive action towards restoring rational, free market pricing to the natural gas producing industry would be one very constructive action Congress could take. Also, Congress should be particularly concerned about potentially regressive energy initiatives, including proposals to "enhance" government revenues by increasing the tax burden of the oil and gas producing industry. The best -- and least costly -- solution to our energy problems lies in putting Americans and American industry to work producing more energy for America.

As background, I will leave with the Committee copies of slides that provide additional information on the comments in this testimony.

Thank you very much.

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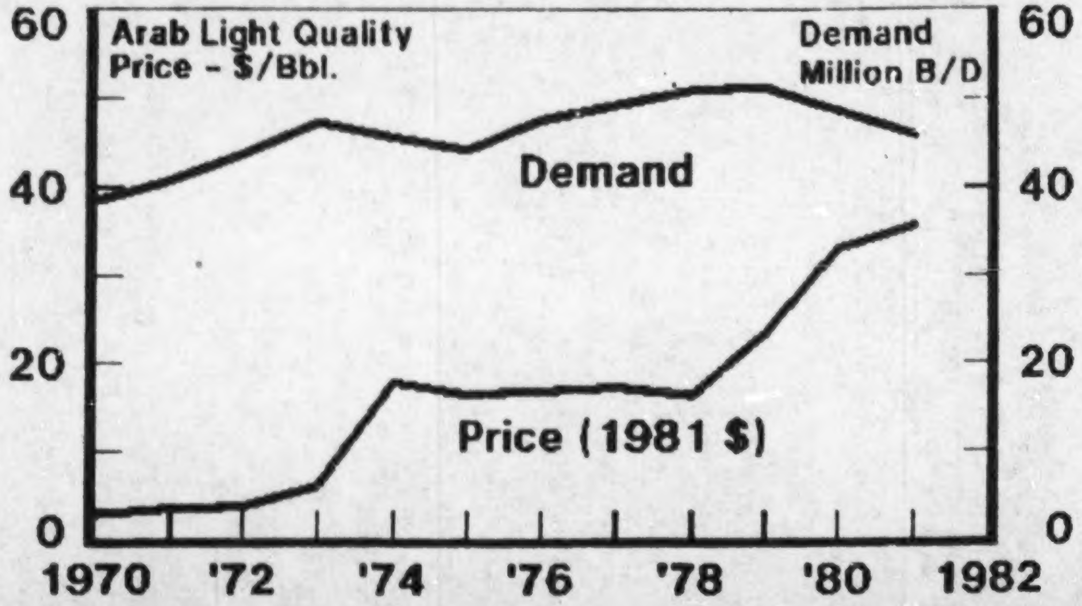
Free World Oil Demand and Price



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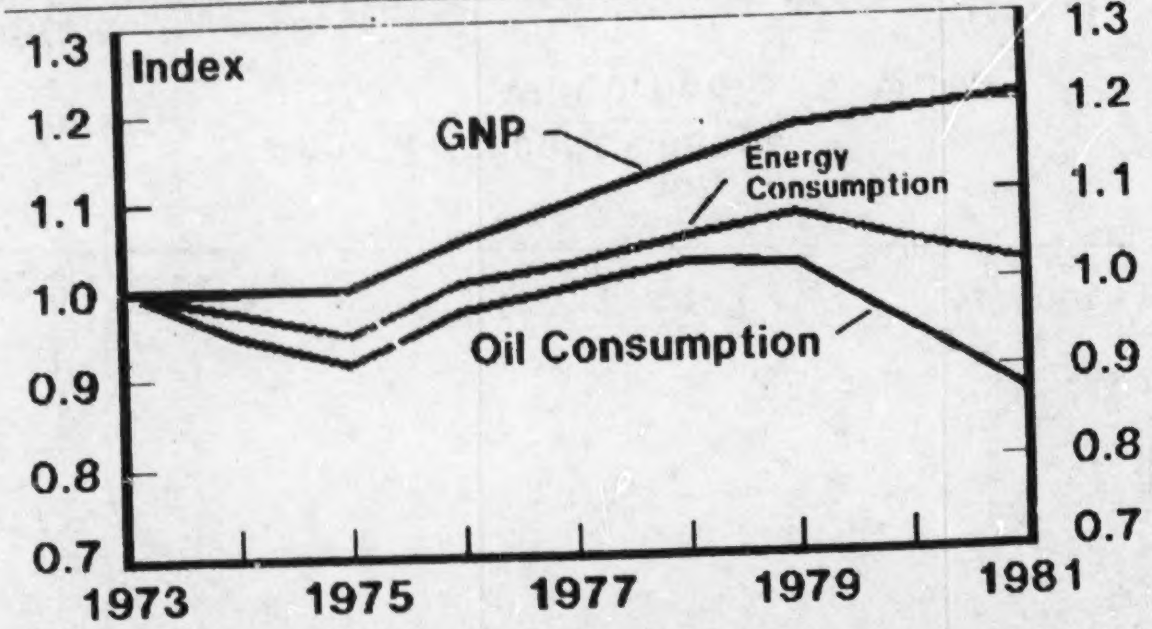
OECD Energy & Economic Growth



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Real GNP

	Annual Percent Change		
	U.S.	W. Europe	OECD
1980	0	1	1
1981	2	0	1
1982	-1	1	1

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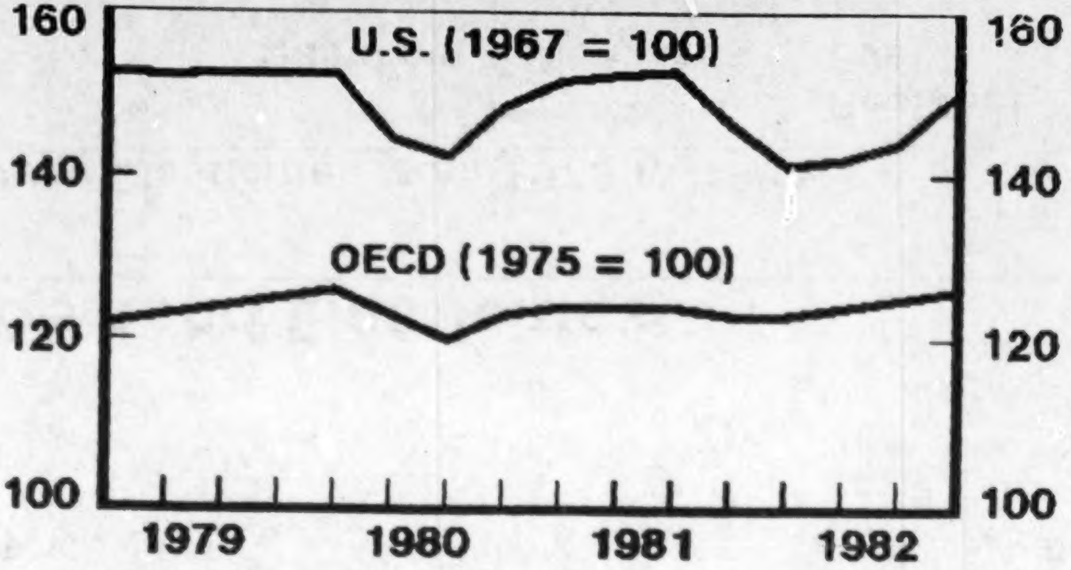
0

Index of Industrial Production



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Oil Demand Elasticities

Observed Elasticities from 1979 to 1981:

	Gasoline	Distillates	Residual Fuel
U.S.	-.3	-.25	-.5
OECD Less U.S.	-.2	-.3	-.3

Used in Long-Term Forecasts = -0.9

POSSIBLE OVERESTIMATION OF OIL PRICE EFFECTS

- Drawdown of Secondary Stocks Exaggerates Decline
- Declining Oil Use in Industry
- Smokestack Industry Recession
- Radically Altered Perception of Future Oil Prices
- Shut Down of Biggest Energy Users First
- Coal: Pollution Concerns and High Capital
- Demise of Nuclear Energy
- High Cost of LNG, and Other Substitutes
- High Capital Cost of Conversion/Conservation
- Rise in LDC Oil Usage

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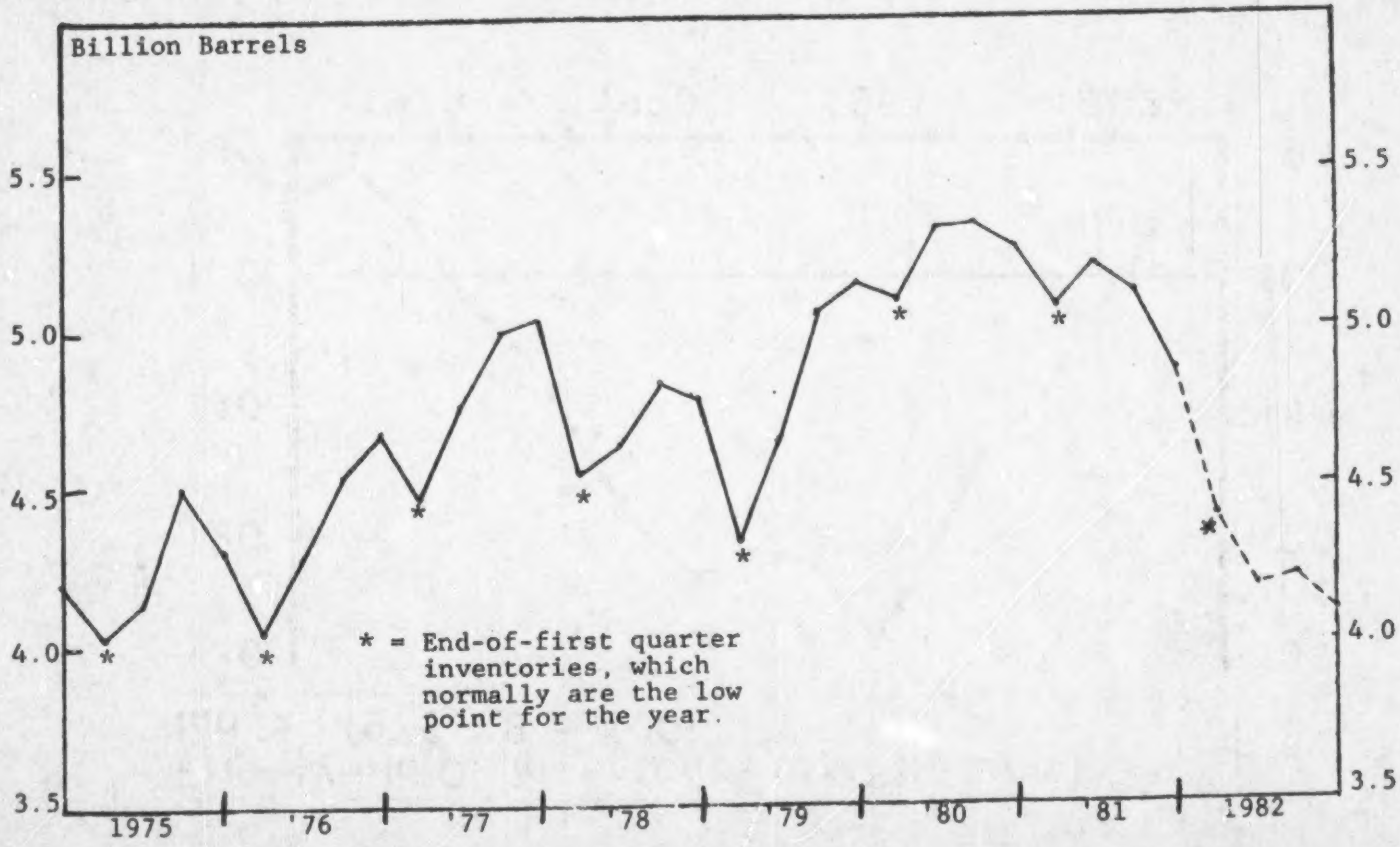
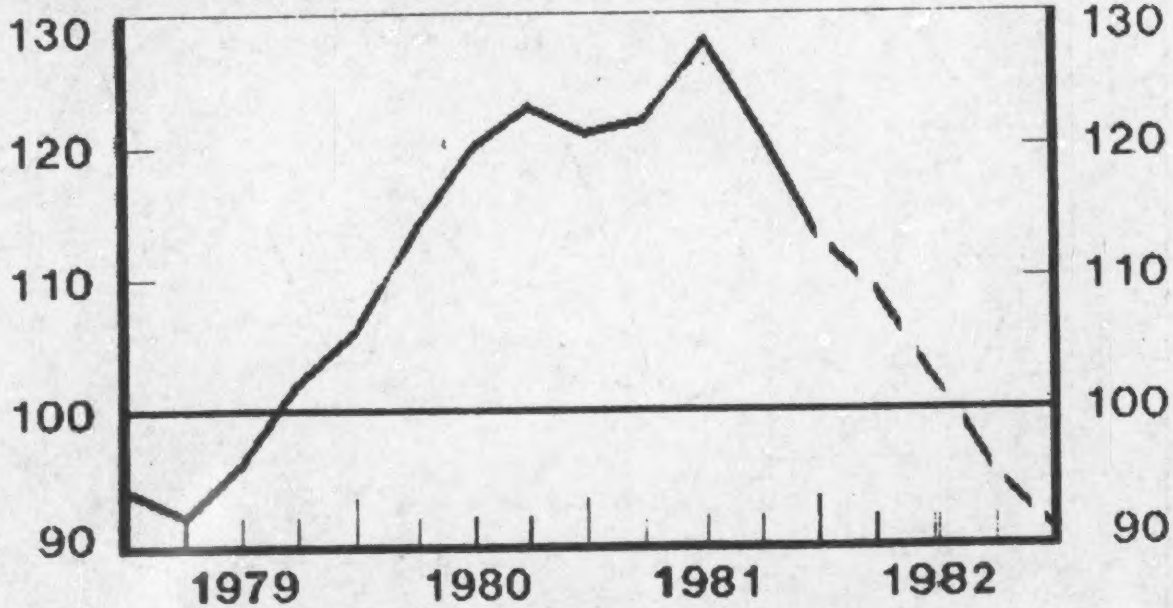
Free World Oil Inventories

	Billion Barrels	Days' Supply
End of Year:		
1975-78 Average	4.7	90
1979	5.2	99
1980	5.3	106
1981	4.8	101
1982 Forecast	4.1	85

FREE WORLD OIL INVENTORIES



Free World Oil Inventories (ex Strategic)
Index (1975-78 = 100)



Index = Ratio of days supply (times 100) to the average days supply in the 1975-78 period. Days supply includes landed stocks weighted by major consuming country, plus oil afloat, but excludes strategic oil inventories.

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OPEC Production
(Million B/D)

	1981	1982	
Saudi Arabia	10	7	(or less)
Iraq / Iran	2	2-3	
Other	10	10-11	(or more)
Total	22	20	

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1982 OPEC Production

	March	2nd Qtr.	2nd Half
Saudi Arabia	7.5	7.0	7.5
Iran/Iraq	2.0	2.4	2.8
Nigeria	1.0	1.3	1.9
Other	7.5	6.8	8.9
Total	18	17.5	21.1

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OPEC Production (Million B/D)

	1982	1985	1990
Saudi Arabia	8	7	7
Iran/Iraq	3	4	5
Other OPEC	9	11	10
Total	20	22	22
Memo:			
Free World Supply	43	46	48

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Change in Free World Oil Demand

	%/Year		
		vs. Prior Year	
	1981 vs. 1978	1982	1983
U.S.	-6	-5	0
Other ODEC	-4	-4	1/2
Other Free World	3	2	4
Total Free World	-3	-3	1

Free World Oil Demand
(Million B/D)

	1979	1981	1982	1985
U.S.	17	15	14	14
Other Industrial	23	19	19	19
LDC's	11	12	12	13
Free World	51	46	45	46
Memo: GNP (%/Yr.)	3.6	1.5	1.5	3.5

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Free World Oil Supply
(Million B/D)

	1979	1981	1982	1985
OPEC Crude	31	22	20	22
Other Supply	21	23	23	24
Free World	52	45	43	46
Inventory Buildup	+1	-1	-2	0

U.S. Primary Energy Consumption

	%/Year Growth		
	1960-73	1973-81	1981-2000
Oil	4	-1	-1
Natural Gas	4	-1	0
Coal	2	2 ½	4
Other	7	5	4
Total Energy	4	0	1
Memo: GNP	4	2 ½	2 ½

Free World
Primary Energy Consumption

	%/Year Growth		
	1960-73	1973-81	1981-2000
Oil	7	0	1
Natural Gas	7	1	2
Coal	1	2	3
Other	6	7	4
Total Energy	5	1	2
Memo: GNP	6	3	3 ½

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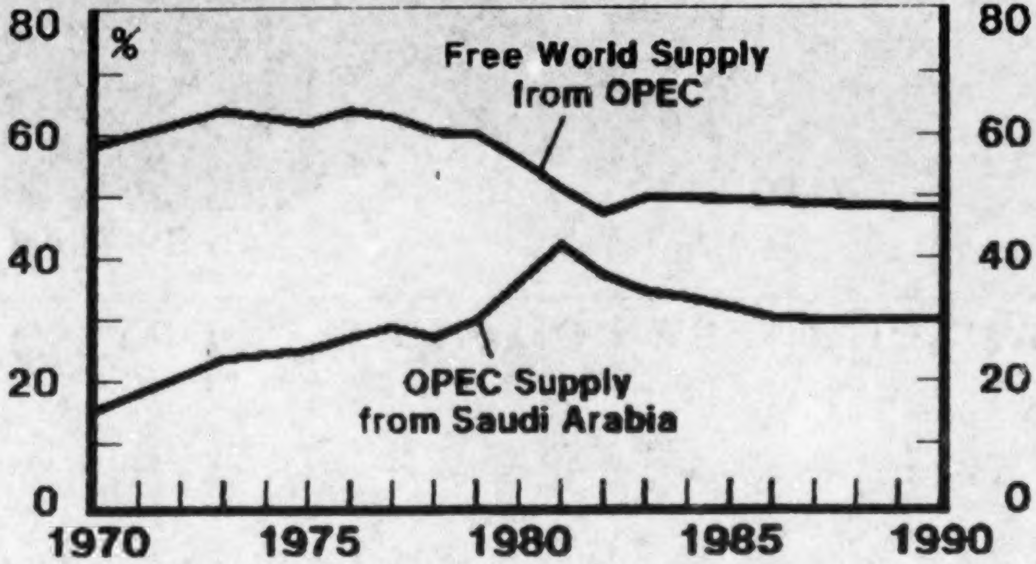
Free World Supply



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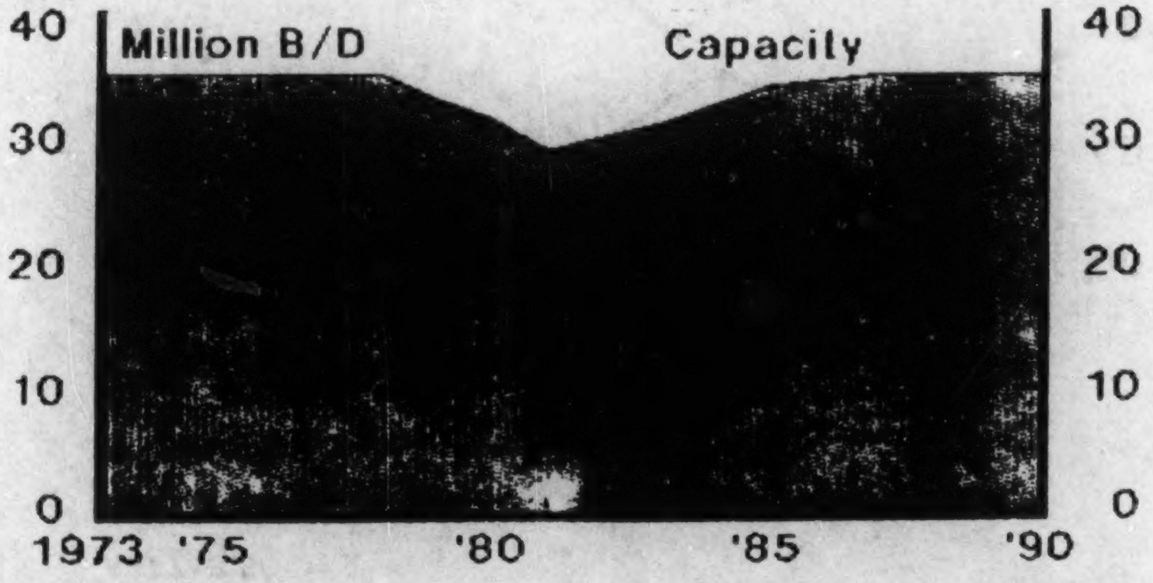
OPEC Crude Production vs. Capacity



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Gas Supply/Demand Balance (TCF)

	1980	1985	1990
Demand	20.2	19.9	19.3
Supply: ex. North Slope	19.2	18.4	17.1
North Slope	-	-	0.9
Imports	1.0	1.5	1.3

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Competitive Fuel Costs (Delivered)

	1982 $/Million BTU
Natural Gas: Average Price	3
New Gas	4
Residual Fuel	5
Crude Oil	6
Shale Oil	9
Coal-Liquids/Gasification	15
Solar	20

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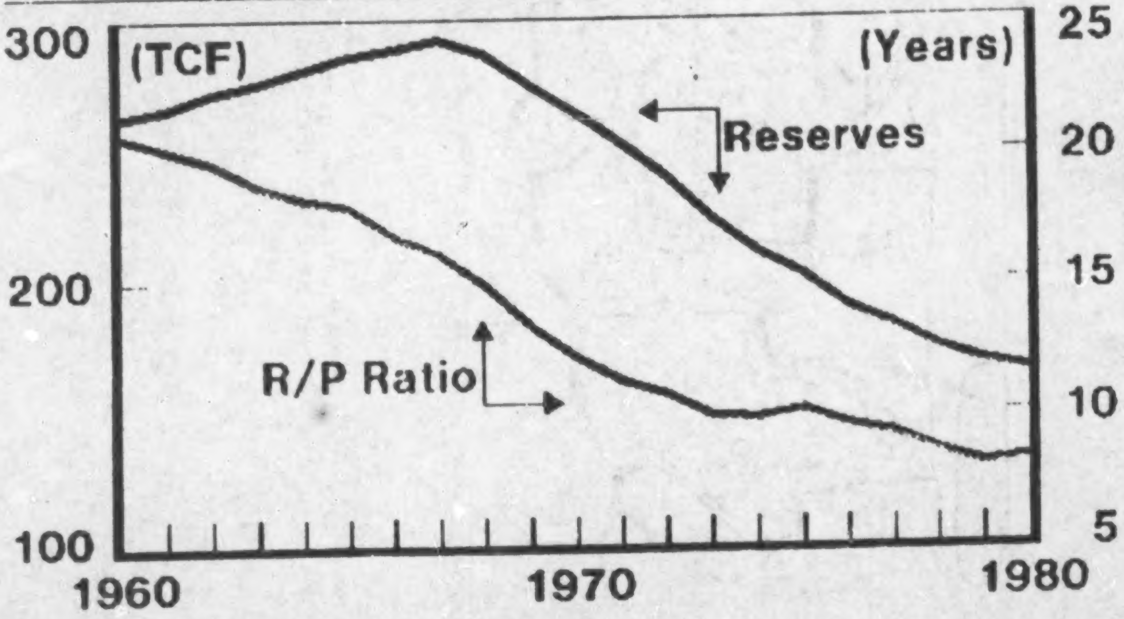
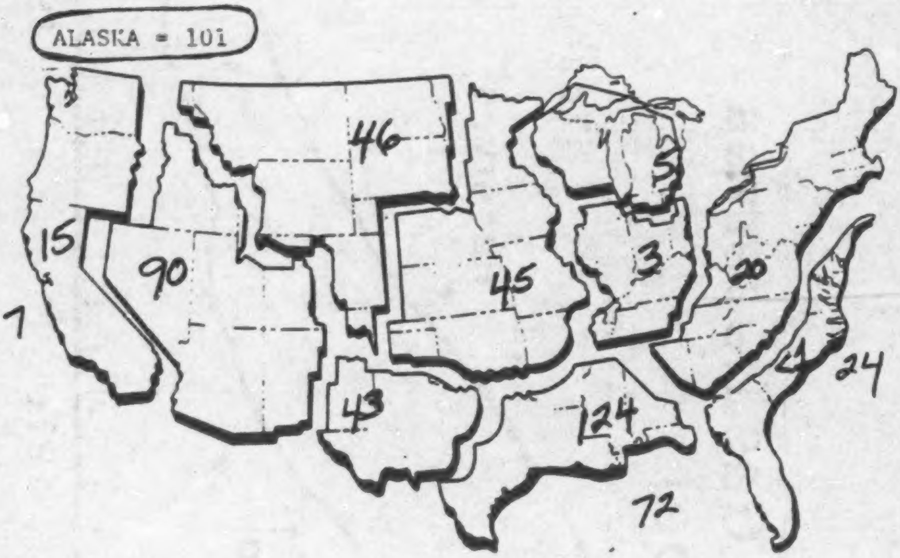
Declining U.S. Gas Reserves (Ex North Slope)



UNDISCOVERED NATURAL GAS RESERVE ESTIMATE BY USGS
(TCF)


ALASKA = 101
46
15
90
7
45
5
3
20
43
124
4
24
72

Undiscovered Gas Reserves = 600
Proven Reserves (not shown) = 200

800 (45 years)

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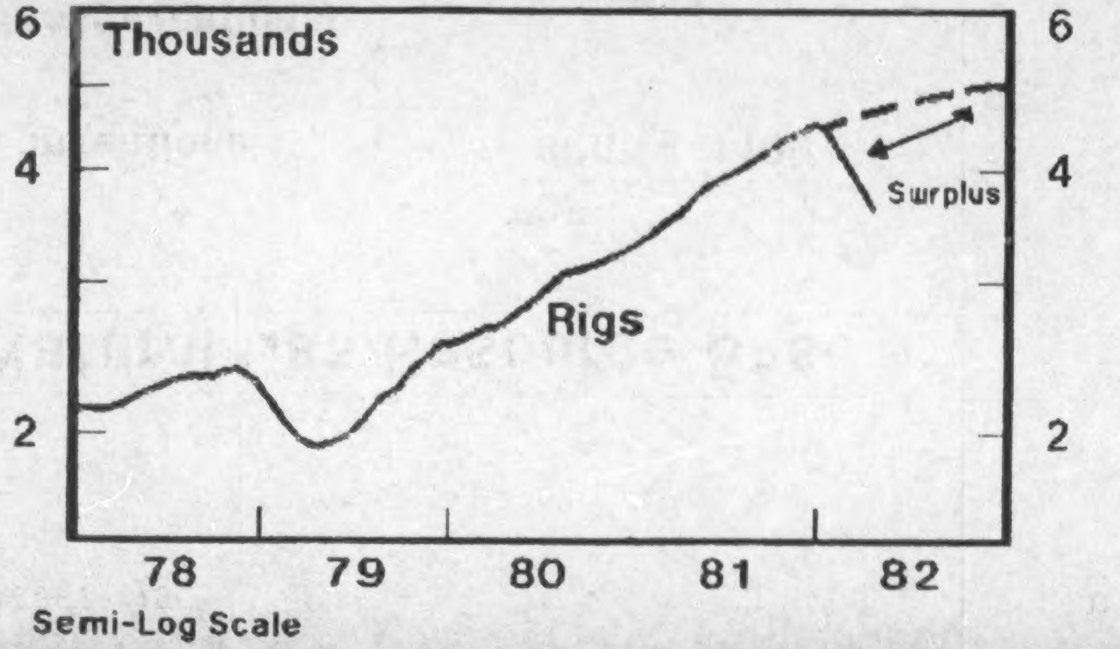
0

Natural Gas Resource Base

	TCF		
Conventional	800	-	1100
Nonconventional			
- Tight	200		600
- Devonian Shale	10	-	700
- Geopressurized	0	-	1600
- Coal Seams	20	-	50
		-	
Total	1030		4050

Rigs Operating In the U.S.



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Crude Oil Price Spread ($/Bbl.)

		April, 1981	April, 1982
Arab Light Official (FOB)		32	34
Arab Light Spot		35	29
U.S. Domestic		37	31
S. Arabian:	Advantage	3	-
	Disadvantage	-	5

U.S. Supply/Demand Balance

	Million B/D		
	1978	1982	1985
Oil Demand	18.9	15.3	15.2
Less: Domestic Prod.	10.3	10.2	10.1
Misc.	0.4	0.2	0.1
Imports	8.2	4.9	5.0
Memo: '79 Consensus			9.0

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U.S. Imports of Crude & Products

	As % of Demand	% from Mid East
1977	47	35
1982	32	30
2000	37	25

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1981 Oil Import Dependency

	Oil Imports as a % of:		
	Oil Demand	Total Energy	% of Imports from Middle East
U.S.	35	15	20
W. Europe	80	40	60
Japan	100	60	60

U.S. Synthetic Fuels Forecast (Million B/D)

	1990	2000
Shale Oil & Tar Sands,	<0.1	0.3
Coal Liquids & Gas	-	0.2
Biomass	-	-
Total	0.1	0.5
% of Requirements		
Primary Energy	0.2	1
Liquid Fuels	0.7	3

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Synthetic Liquid Fuels (Crude Oil Equivalent Price)

	1982 $/Bbl.
Coal Liquefaction	
Indirect	90
Direct	80
Oil Shale	50
Tar Sands	55
Memo: Crude Oil	31
New Natural Gas	17

ROLE FOR SYNFUELS

- Engineering and R&D now as opposed to building large scale demonstration plants.
- No advantage to constructing large synfuel plants to demonstrate $50 to $80/bbl. oil.
- Need will eventually be there, but the time has not yet arrived.

Increase SPR Fill Rate

- SPR is the nations only real defense against a supply disruption.
- Salt dome storage capacity additions limit SPR fill rate to 200 MB/D for the forseeable future.
- There are alternatives to salt dome storage:
  - Refinery cutbacks and closures release tankage with little or no alternative use.
  - VLCC's available at low cost. No current need for many so available at essentially scrappage value.
  - VLCC storage provides flexibility to move crude where it is needed in an emergency.
  - Refinery tankage/VLCC storage provides added security against potential sabotage - Not all the oil is on the Gulf Coast.
  - Steel tanks/VLCC storage may not be much more costly than salt cavern storage because 100% of the oil is recoverable versus an unknown portion that can not be recovered from leached caverns since they wind up with unusual configurations. The high price of oil makes recovery differences an important factor in the overall cost comparison.
- It is to the nations advantage to help prevent VLCC scrappage by utilizing them for SPR storage. The VLCC's can be released to active service at a later date when they are needed and cavern capacity is available, thereby keeping tanker rates from rising rapidly when the time comes to replace worn out vessels

The **Chairman**. Dr. Conant.

STATEMENT OF DR. MELVIN A. CONANT, PRESIDENT, CONANT & ASSOCIATES, LTD.

Dr. **Conant**. Thank you very much, Mr. Chairman. I appreciate this opportunity, but I would also like to begin by expressing once more my thanks to you and the courtesy you showed me nearly 10 years ago when some of the matters we are discussing today were before us.

The **Chairman**. I wish you and I had had much more influence on what happened in between.

Dr. **Conant**. Thank you. I find myself in such substantial agreement with a great deal of what you have heard this morning that I can only characterize the message that has come from most of us as being one of unusual solemnity, and therefore I would like to confine my remarks if you will, Mr. Chairman, to a few particular points about some of the things that we have been told this morning which I think deserve further support.

I think the first comment is that almost regardless of any conceivable growth in GNP over the balance of this decade that we will have adequate petroleum reserves, and that we will have adequate producing capacity.

The problem is far more likely to arise out of the consequences of political actions by suppliers and it is on this aspect that I would like to concentrate.

You emphasized in your opening remarks the sheer unpredictability, and this has been borne out in the testimony that you have heard, but I would like to emphasize that one of the particular reasons for the unpredictability is the loss of confidence in the observance of contracts in supply. We are far removed from the period when the international companies could promise to obtain end supply. The role of governments intervening in this process has turned a commercial asset into a strategic commodity. Hence the involvement of government in almost all aspects of supply is now the common condition.

The second point I would like to emphasize is that as far ahead as I think anyone can be expected to think, most of the free industrial world will continue to import oil. There will only be a few exceptions to this, and we cannot even be absolutely certain of them. We have heard from Dr. Eck a suggestion that the U.S. import level will increase. We do not know the success Canada will have in its own energy policy. We cannot tell about Australia, but for the bulk of the European states and certainly for Japan, their need for continuing to import oil will be the fundamental factor in international supply.

Hence I think it is useful then to go on and make a single point about the non-OPEC suppliers. The great distinction for the industrial world may be the less likeliness of political action by non-OPEC suppliers to affect volume and price, but I am not all together sure that this can be presumed. I feel quite confident that there will be no difference in the interests of non-OPEC suppliers of the international barrel from those who are members of OPEC. In this sense, greed is ubiquitous and each will strive to get the greatest possible return on the barrel, so any concept by the United States or by other key importers that the simple encouragement of non-OPEC supply will result in better economic terms to the importer is suspect.

The Middle East in particular as I think you yourself mentioned will remain thus in this decade and probably the next as the most prolific source of the international barrel. There is no possible rival to these sources of supply. Hence when one talks about the political situations that could lead to an interruption of supply, we are accustomed to turning mainly in thinking about the Middle East. We have heard some of these this morning. Let me add a few others and then discover with you that in other parts of the world there are other manifestations of political influence determining supply.

I think the initial point, Mr. Chairman, is that up until really a very few years ago, our concern was over political action that might lead to embargo or a boycott of importing countries, particularly the United States. With respect to that, I would suggest that the terms of the danger have now altered. It may be that it is not so much the danger of a sustained OPEC embargo upon the consuming world, but an even far more difficult question which is the capability of virtually all entities in the Middle East to create very substantial war damage on fields and facilities. This was not the case in the early seventies. It began to be the case in 1979 and 1980, but the kind of hardware that we and others have been supplying to the Middle East has given them a longer distance striking capability which really makes a problem of war damage particularly acute.

Therefore, in addition to the problems that would be posed to producers, suppliers, and importers rising out of an Israeli-Arab confrontation, we now see in the relationship between Saudi Arabia and Nigeria something which does extend beyond the economic or the fiscal impact of sustaining prices. Nigeria and Saudi Arabia for a number of years have had a very close political relationship dealing with events in central Africa, and I think this has probably been a factor in the selection of Nigeria by Saudi Arabia for special support.

In the case of Iraq and Saudi Arabia or Iran and Saudi Arabia, you will remember that in much of the history of international oil in the fifties, sixties, and seventies, it was the rivalry between these three suppliers that caused some of the greatest concern among the importing countries—who would lift and to whom? That kind of rivalry is likely to reemerge with any kind of an armistice between Iraq and Iran.

You have had a Syrian, Iranian, Iraqi connection mentioned this morning. It is quite an interesting one. It would appear as if the Syrian action depriving Iraq of its eastern Mediterranean outlet was engineered in cooperation with Iran which has chosen to supply Syria with those volumes of oil which it lost when it cut Iraq off from the team. This is clearly a political decision, but outside the region you have mentioned Norwegian energy policy. This is as much as political matter as anything that could arise in the Middle East.

You have referred to the Soviet gas deal to Europe. I would add only one dimension to what the earlier discussion brought forth. I would say there is a broad political dimension to that deal which arises out of the European proximity to the Soviet Union, and the sense on the part of many Europeans that they would prefer to have more dealings with the Soviet Union in the commercial and economic and, indeed, the energy area. This is a judgment on their part, and I think it is a political one and has to be put on the list.

The French-Algerian gas deal which we heard about which resulted in a cost to France higher than the ordinary market forecast would have indicated had a very major political element in it which arose out of past history, Iran's present inclinations, but also the commercial sideliners which went along with the gas deal which sustained French employment and key industries. Then we have in the case of Italy and Saudi Arabia only recently a return to a supply situation that had been deeply affected by political argument between these two countries.

Let me also suggest, Mr. Chairman, that Dr. Eck's references to taxes, tariffs, and we could add floor prices in the United States, would be also a major political decision and that, therefore, when we look at the circumstances that will affect world petroleum outlook, we should not leave ourselves out of the picture and the impact that we would have if we were to adopt certain policies which would serve to affect the mix of world fuel consumption.

Mr. Chairman, there have been references indeed to, the word used was the awesome power of Saudi Arabia. I think this is probably true, but a cautionary note might be helpful.

In pursuit of Saudi objectives, the closer Saudi Arabia gets to either the lower end of the spectrum of its production capability as is now probably the case, or in earlier times, the higher its production went and began to come closer to its maximum sustainable production, the less Saudi influence there was, and so one has to I think be careful not to continue to ascribe to the Kingdom the same degree of influence that it had when it was operating closer to the middle and had a choice of going in one direction or the other. It is debatable how much lower Saudi production could actually go at this point and permit the Kingdom to sustain its political objectives in the Middle East, one of them, for example, being a very large fiscal support of Iraq, but with other countries as well.

Most of your panel have stressed, as do I, the vital need for increasing attention to the alternatives to oil. The situation that Dr. Eck described is one that I fully support, and therefore, we may have to think again of the kind of policies of our Government which will be necessary to bring forth those alternatives to oil which would mitigate the situation we will otherwise face.

In final, I am asking if we can assume that the astonishing decline in oil demand of the past 1 to 1½ years is a permanent change? I am dubious about that. After 30 years of explosive growth in the demand for energy and demand for oil in particular, I cannot conceive that there could be a permanent change that would come so quickly and be so large.

The vital need then remains for the alternatives, but without these on a scale sufficient to greatly reduce the role of oil, nothing very much may have changed from the early seventies, and we have heard that we may discover that sooner rather than later. Thank you, Mr. Chairman.

[The prepared statement of Dr. Conant follows:]

Melvin A. Conant

Testimony
U.S. Senate Committee on Energy and Natural Resources

April 23, 1982

"World Petroleum Outlook"

Mr. Chairman, I am Melvin Conant, president of Conant and Associates, Ltd. and editor of the monthly report "Geopolitics of Energy." My background includes a period on the faculty of the National War College, on the directing staff of the Council on Foreign Relations, a senior government relations counselor to the Exxon Corporation, and Assistant Administrator for International Energy Affairs, FEA, 1974-76. Since then I have been interested, as a consultant to companies and governments, in the whole setting in which international energy flows -- its economic, political, and security dimensions.

This background has helped give me a larger appreciation of the factors shaping the "World Petroleum Outlook" and I welcome this opportunity to review the subject with you.

There is no such thing as "energy" or "petroleum" except in the laboratory. Everywhere else, the topic is not discrete but enmeshed in a very broad range of interests, private and governmental. Only ten years ago, the flow of international oil was governed mainly by commercial considerations; today, oversight is exercised by virtually every oil-exporting and oil-importing country over the movement of petroleum, and often through direct involvement. It is simply not realistic to think of energy flows in simplistic terms of "market forces." Obviously, supply and demand work their way but they are almost always influenced by decisions of governments.

On the issue of government oversight, the United States is almost the only large energy producer and consumer which does not have its own entity to watch over international energy movements. We believe, usually, in the strength of our system; at the same time we have to understand that in these respects we stand alone. Energy is not a matter which most of us place in the catalogue of government responsibilities. This belief continues to create stress within our alliances, and in our relationships with oil producers.

These points need mention because international movements of petroleum respond to a number of forces. We need only refer to the heightened tension in the Middle East of recent months, perhaps climaxing April 25th, in which an emergency could lead again to the use of oil as an Arab weapon, or to the anticipation of such by oil importers who would once more seek privileged access to a particular producer's supply. There are other examples of non-market forces which influence international oil --

1. Saudi Arabia's (and Kuwait's) resolve to compel buyers to return to Nigerian sources. Surely, there are political undertones to such an extraordinary decision.

2. Saudi Arabia's very large financial support of Iraq -- counting all Arab sources, perhaps as much as $22 billion over the past year; surely some of the reasons for doing so lie in the politics of the Gulf.

3. Iran's refusal in past years to coordinate oil policies with Saudi Arabia were in part economic but were largely because the Shah sought to make Iran recognized as the paramount power of the Gulf; the coming of Ayatollah Khomeini has not relieved stress in the region, stress which has deep historical roots.

4. Norwegian (or Canadian) energy policies have an evident, deep political element as does the matter of

5. Increased Soviet gas supply to Europe.

6. Moreover, the recent French-Algerian gas deal is far from being solely an energy agreement as it is saturated with other trade, political, and ideological considerations.

7. Finally -- but not to complete the list -- there is a prospect -- drawing near -- in which the need will be reargued for a floor price for international oil, or we shall be arguing (again) on the merits of a tariff on imported oil. The multiplicity of interests which stand to benefit or lose from such a tariff make it an issue which has to be determined by government -- itself a very political act.

With these circumstances in mind, one's definition of the world petroleum outlook is clearly broader than economics alone can provide. But one must still make clear how one views such issues as adequacy of reserves and of supply, the ratio between energy and GNP growth rates, the value of alternatives to oil; and the likelihood of further improvements in energy efficiency? What is the effect of inventory drawdown in creating the current "surplus" of supply? What has been the effect of recession? What might be the consequences of recovery? What would be the effect of a producer-importer agreement on both the need for adequate revenue for the former and lower prices for the latter, based on the common interest of all in prolonging the petroleum era. The exporter wishes to prolong the era to afford him further opportunities to diversify his country's economy; the importer needs time to develop alternatives to oil -- more coal, more gas, perhaps even more nuclear.

With recession, conservation and the contribution of alternatives to oil, there is scarcely any analyst who is worried about the adequacy of oil reserves worldwide, to meet demand, unless one believes there will be, for the rest of the century as high a growth rate in energy as characterized much of the past three decades. But we should not dismiss earlier concerns. We are still not replacing oil from proven reserves; we are still drawing down on our oil "capital."

There is little doubt about the interest of exporters in increasing supply to earn revenue -- and, if possible, increasing prices. Current OPEC crude oil production hovers between 16 MMB/D and 17 MMB/D (3 MMB/D or so is for domestic use); if circumstances improved (demand rose to the 1978 level), nearly twice that amount could be obtained. Non-OPEC oil sources provide an increasing share of the international barrel -- perhaps as much as 40 percent of the oil in trade. It is not always appreciated that nearly half of non-OPEC oil represents Soviet exports. The thought that for economic and political reasons producers might withhold supply, for the purpose of conserving a diminishing resource, seems very remote at a time of dwindling revenue and fiscal fright among most oil exporters. Nevertheless, it has been less than two years since concern about adequate volumes was an important factor driving governments to obtain greater assurances of supply.

Much is being made today of the break between GNP and energy growth rates with some heralding of the dawn of an era in which GNP can rise with only minor increases in energy consumed. A few years ago we heard much talk about zero energy growth. Today, with insufficient evidence of energy growth rates it seems difficult to sustain the argument that we have freed ourselves from the experience of the past hundred years. We shall simply have to wait for far-greater evidence than is now available to be sure of what is happening. Similarly, we have to be careful of the claims for the scale of energy economies -- we have been saving something, but how much and for what reasons still elude us. The extent to which commercial inventory drawdown contributes to the current surplus is unknown. If you believe the IEA, the drawdown is not much higher than the usual winter rate. Many others claim the drawdown is 2-3.5 MMB/D greater than normal. We do not know what the effect of recession is on demand; we cannot know -- cannot even guess intelligently -- what the effect of recovery will be on petroleum demand.

For the longer run, the pattern of demand for energy is likely to be as in the table below.

Incremental Additions to World Energy (%)*

	1960s	1970s	1980s	1990s
oil	61.7	41.4	24.8	5.2
gas	23.7	17.8	18.4	23.2
coal	7.5	21.9	30.0	38.7
nuclear	1.0	7.2	4.8	11.9

*World Bank, World Development Report 1981, p. 39.

The course of events among OECD nations since the Venice Summit of 1980, is described in the following memorandum on the "OECD Fuel Mix" by Jean Newman Glock, Senior Research Associate in my company. It emphasizes some achievements to date, and some grave uncertainties. If the investments into alternatives proceed, the world petroleum outlook could be profoundly altered by the end of this decade.

6

OECD Fuel Mix

Jean Newman Glock

Fuel substitution has been cited as one of the causes of the recent oil surplus. Has the shift to alternatives been overstated, or have OECD nations begun a significant move away from oil dependency? Could many have decided that present economic conditions and questionable future energy needs do not support investments in alternative energy sources?

At the height of reaction to the second oil price shock of 1979, seven members of the OECD (United States, Canada, France, the United Kingdom, Japan, the Federal Republic of Germany, and Italy) committed their countries at Venice in June 1980 to begin the transition away from oil dependent economies. Almost two years have passed, and the world oil situation has eased to one of surplus. How have the OECD nations been progressing on each of the five Venice objectives?

The first commitment was to break the tie between the gross national product (GNP) growth rate and the oil consumption growth rate. This has, at least for the present, apparently occurred. In 1980 and 1981, OECD GNP rose by 1.3 percent and 1.25 percent respectively, while OECD oil demand fell from 41.5 MMB/D in 1979 to 35.7 MMB/D in 1981, or 14 percent. How much of this improvement is attributable to fuel substitution, and how much is due to recession? Many experts argue that the tie between energy use and GNP growth has been broken by price. This will only be proven or disproven by measuring the rebound in energy consumption following economic recovery. Can we put the requisite investments on "hold" until we find out?

The second Venice goal was to decrease oil's percentage of total energy consumed to 40 percent by 1990. Again, the picture looks promising. In June 1980, oil accounted for 53 percent of total energy consumption; today, its share is near the 40 percent goal set for 1990. Therefore, some substitution has been taking place. Existence of fuel switching can also be seen in a recent OECD study, which concluded that the United States, United Kingdom, France, Federal Republic of Germany, Canada, Japan, and Italy have decreased the amount of oil used per unit of economic growth by 23.4 percent from 1978 to 1981. The study concluded that the total amount of energy used to generate each unit of economic growth fell by 7.9 percent during the same period. This illustrates that the energy growth-GNP ratio has dropped to less than one, and that economic growth generated by non-oil energy sources has been increasing.

The final three objectives of the "Big Seven" meeting in Venice were to develop 15-20 MMB/D of oil equivalent (MMB/DOE) non-oil energy supplies by 1990, to double coal production and consumption by the early 1990s, and to realize the "vital contribution" of nuclear sources. Progress on these aims is less encouraging, though they are still achievable if immediate measures are taken by all OECD nations, most particularly the United States, to hasten the shift. Unfortunately, the current respite from tight supplies and ever-increasing oil prices being enjoyed by OECD nations has reduced the urgency most OECD nations feel toward promoting active (as opposed to passive -- what the market prompts) fuel substitution.

At an OECD/IEA Parliamentary Symposium on "Energy and the Economy" (April 10-11, 1981), Reference Case Scenario's were developed for 1985 and 1990. These were not projections, but estimates of what could be accomplished if IEA nations (France is not a member of IEA) took strong immediate measures to encourage fuel substitution. Even these optimistic scenarios (developed as the oil situation was easing, which should have made it easy to surpass the goals set at Venice) barely meet or fall short of the objectives set in June 1980 (See Table). IEA non-oil energy consumption for 1979 was approximately 37.0 MMB/DOE and is projected to be 43.9 MMB/DOE in 1985, and 54.2 MMB/DOE by 1990. Therefore, this estimate, based on the immediate implementation of stronger fuel substitution policies, foresees an increase of 17.2 MMB/DOE of non-oil energy sources. This is within the "Big Seven's" range of 15-20 MMB/DOE, it is true, but it is still disappointing in light of the fact that it is a decidedly optimistic scenario including progress by all IEA nations.

IEA Non-Oil Energy Consumption
mmb/doe[1]

	1979	Reference Case Scenario 1985	Reference Case Scenario 1990
Coal	14.9	18.0	23.6
Gas	14.6	15.7	17.4
Nuclear	2.6	4.7	6.8
Hydro	4.7	5.2	5.8
Others	.04	.2	.6
TOTAL[2]	37.0	43.9	54.2

[1] Conversion factor: 1 mmb/d = 48.6 mmtoe/year 1979.
1 mmb/d = 49.2 mmtoe/year 1985 and 1990.

[2] Numbers may not equal total due to rounding.

Source: "Energy and the Economy," OECD/IEA Parliamentary Symposium (April 10-11, 1981), p. 25.

Coal

The IEA study has coal consumption increasing from about 14.9 MMB/DOE in 1979 to only 23.6 MMB/DOE by 1990, again only *if* stronger policies are implemented. Hardly the doubling of coal consumption agreed to in Venice. The range of projections on U.S. coal supply, perhaps the most critical IEA coal producer, now estimate 1990 production between 10.9-14.1 MMB/DOE, up from 7.5 MMB/DOE in 1980. Coal imports to Europe are currently estimated to cost 30 percent less (50 percent less to Japan) than imported oil on a MMB/DOE basis. The market clearly indicates a need for increased coal use, but it is highly doubtful that the market will work well enough to solve infrastructure, labor, pollution, and other problems which inhibit its use.

Natural Gas

The IEA scenario sees natural gas supplying 17.4 MMB/DOE by 1990, up from 14.6 MMB/DOE in 1979. To take two extremes, in the United States natural gas supplied about 9.3 MMB/DOE in 1980 and projections for its contribution in 1990 range from 4.9-9.5 MMB/DOE. Therefore, the most optimistic appraisal sees an increase of .2 MMB/DOE over 1980 and the most pessimistic, a drop of 4.4 MMB/DOE. Projections for Japanese use of natural gas are more hopeful and predict that natural gas use will double during the decade, supplying 5 percent of total energy in 1979 and up to 9.7 percent in 1990.

Nuclear

The "vital contribution" of nuclear power, which accounted for 4 percent of total OECD energy supply in 1980, is projected by the International Energy Agency (IEA) to supply 9 percent of OECD total primary energy by 1990. This increase is attributable to the coming on-line of plants initiated in the 1970s. If new orders for nuclear plants are not initiated soon, the nuclear contribution to energy supply after 1990 will fall precipitously. France stands alone among the OECD nations in its active promotion of the nuclear option. Long lead times (now averaging seven to nine years), regulatory problems, public opposition, and waste disposal issues all continue to make a significant realization of the nuclear energy potential doubtful in other industrial nations.

Hydro and Other Energy Sources

Additional non-oil energy contributions from hydro and other energy sources by 1990 are projected to be minimal. Again, under the optimistic scenario of the IEA report, hydro and other energy consumption is projected to increase from 4.74 MMB/DOE in 1979 to 6.4 MMB/DOE by 1990.

Summary

Many assume that the goals set at Venice in 1980 are being met and even surpassed. However, there is a crucial difference between then and today: Two years ago most OECD nations assumed the government's role to be critical to the achieving of the energy goals. Now, the United States, Germany, and Great Britain place a firm reliance on market forces to accomplish these tasks; the balance of key OECD members -- France, Italy, Japan, and Canada -- do not. While acknowledging the surplus, they are mindful of the unpredictability of supply and are more determined that the Venice goals will be achieved; that the great investments into new energy directions are in fact made.

Lead times for all alternatives to oil are ever-extending, and though the figures of the past sixteen months look good, OECD nations could very well be caught short of necessary options by 1990 if past commitments do not become realities.

Everything depends upon the availability of alternatives to oil. Japan offers one promising example of a key state, which has deliberately, through a sustained commitment of resources, been determined to improve its lot. From 1973 to 1979, Japan's use of oil in primary energy supply decreased by 2 percent, while imported crude and products dropped by 3.6 percent. Natural gas and LNG use rose by 274 percent; coal use remained virtually stable, and the nuclear contribution rose 625 percent.

All OECD nations must proceed to develop and utilize alternatives to oil with such long-term commitments. If these do not get developed in requisite volumes, then even modest economic recovery will find oil exporters and importers almost where they were ten years ago, allowing for some price-induced conservation and some greater efficiencies in energy use.

Assuming the oil will still be the leading commercial fuel by the end of the 'eighties, one should expect in the interim real price increases in the range of 2-3 percent p.a. However, given the presence of politics in supply, the continuing OECD need for imports and thus a search for assured supply, we should anticipate there will be less likelihood for steady and relatively moderate increases in oil prices; we could easily experience again the "surge" phenomena which could result in a doubling of oil prices by the decade's end.

The policy for an oil importing government should then be one of enlarging upon its energy choices, and reducing its vulnerability to supply cuts and price surges. The need for alternatives to oil is fundamental. A declining price for oil does not readily attract the "market" into making investments in other "key energy" options. Are we going to watch these market forces define the national energy interest? If we do, we shall be virtually alone among the great energy producers and consumers to do so.

The **Chairman**. Thank you very much, Dr. Conant. I thank all the members of the panel for very thoughtful statements and their contributions to the understanding of the problem.

A couple of things I would like to explore for just a moment and ask for your comments—There is a great deal of speculation that has centered upon the question of whether the OPEC cartel can survive, and there is a great pressure on the OPEC cartel today that has not always existed. But isn't it also fair to say that the OPEC cartel has never worked except in time of crisis until now, so pressure instead of being on the consumers is now on the producer state? As this is the first time with pressure on the producer states that the OPEC cartel has worked at all, and that may be a significant change from the past?

OPEC has existed for many years. Most people in the United States have the impression that it was born in 1973 or 1974. It had been in existence for a long time prior to that, but simply wasn't effective. The price changes that have been enforced have occurred in times of shortage, and I suppose it might be argued that without OPEC the price changes might have occurred in the same manner because demand outstripped supply. It wasn't the presence or absence of OPEC. It was the presence or absence of artificial restraints on supply that were not really OPEC generated. They were politically generated in these areas, and only now for the first time do we see a producer pressure in which OPEC is able to work effectively to reduce production in a way that will affect future, present supplies and future supplies.

I would seek your comments with regard to that.

Dr. **Lichtblau**. I will agree to basically what you say. There is, of course, for the first time what I called in my testimony an OPEC oil shock.

On the other hand, I would not think that OPEC only was effective during a crisis. In fact, I would think OPEC was most effective when there was no crisis because the price explosions that occurred were caused by factors that had nothing to do with OPEC such as the embargo, the Iranian Revolution, but when these events ceased, in a free market prices would have declined and it was OPEC that prevented prices from declining, so OPEC was able to put a floor under an exceptionally high price and keep it there when the reason for that price increase was no longer valid.

In the absence of OPEC after 1973, in March 1974 when the boycott, the embargo ended, prices would have clearly declined, maybe not all the way back to where they were before, but substantially, and again by late 1979 there was no reason at all for prices to be in the near $30 category, so I think that is really OPEC's function, and to the extent that I would call it a success as a cartel, that is OPEC's success.

The Deputy Secretary General of OPEC has specifically pointed to that role of OPEC in a recent speech, namely, that it exerts a floor price when there is no market pressure, upward market pressure, and I think this is what OPEC has been able to do, so it really has had a substantial cartel success since 1973.

The **Chairman**. Dr. Goldmuntz?

Dr. **Goldmuntz**. I would like to comment on that question by going behind your question just a little bit. Does the United States want OPEC or not? I think we ought to be clear on that issue.

I think the answer is we do not wish it. Dr. Lichtblau gave us the situation earlier that without OPEC, without conservation of production in the future by countries that can afford to decrease production when necessary, prices might be as low as $20 a barrel which is the cost of the marginal producer, presumably, so first we ought to have it clear in our minds that in the interest of the U.S. consumer, we would rather do without OPEC, point one.

Point two, the U.S. policy to a certain extent in history helped create OPEC. When Venezuela found that they were losing their market share in the United States in the early 1960's because of large tanker shipments of Middle East crude, they came to us and asked for a quota. We indeed applied a quota to imports, but it was to all imports, and then the Venezuelan and Arab nations got together and that is when OPEC became a serious issue for the rest of the world.

Now that historical piece of evidence says there are perhaps some things that we can do with respect to OPEC. It is really our policy to get rid of that cartel just as we helped form it. Perhaps we can help unform it. Some of the things I mentioned before, such as the strategic petroleum reserve which is insurance, but a tariff on OPEC oil or the proliferation of oil supplies to non-OPEC countries or other areas around the world would be a way that we could impact the importance of OPEC in future years.

Third, I think that OPEC has within it the seeds of its own destruction. I can't tell you whether it is going to be 6 months or 5 years or 10 years, but I believe those seeds will mature as time goes along, and it goes in the following way: If OPEC succeeds in maintaining prices at the current level, then there is a great deal of initiative to continue fuel switching within those countries that are oil importers, and to continue conservation, and for new horizons to come on stream. You have Hibernia in the North Sea. You have West Africa. You have Argentina, the Falklands. You have the Beauford Sea, all of which are more expensive than Arab OPEC sources but, at $34 a barrel, they can all be produced and make people a great deal of money, and OPEC is going to at some point have to face this issue. If they wish to maintain control, the price may be too high at this point in time for that purpose.

The **Chairman**. Dr. Eck?

Dr. **Eck**. I think I am impressed with OPEC's ability to manage the situation where production requirements are 16 to 17 million barrels a day. If they get through this one, presumably it will be a lot easier when OPEC requirements are 24, 25, or whatever it is, barrels per day, so prorationing is working, and it may even work easier in the future.

If we look at these big numbers, the surplus, world oil deliverability, essentially all in the Persian Gulf, all in Saudi Arabia, and the Emirates, it is not a question of getting all OPEC together, but these countries are all right next to each other with a commonality of interest, so you could argue that the business of prorationing and making it all work may be easier rather than more difficult in the future.

Finally, I guess I am concerned about whether or not we are not setting ourselves up in the world for a potential for another OPEC price shock with inventories coming down to these very low levels and as world oil demand goes up and so on, is it possible that world oil prices again could leap upward, not double, but what is there to prevent a 25- or 50-percent increase in pricing?

Another possibility is OPEC formula pricing. There has been a lot of discussion of drop, but that could easily come back again with an OPEC pricing formula which would guarantee regularly scheduled annual increases.

The CHAIRMAN. Dr. Conant?

Dr. CONANT. Mr. Chairman, I think two quick points—I think it is important to remember that when one goes to an OPEC conference or OPEC seminar, that a very high proportion of the leaders of OPEC today were beginning to learn about oil only 22 years ago, and the situation that brought them together was the pressure on producers brought by the consumers.

I think there are a lot of people in OPEC that recall that experience and are nowhere near as ready to rule out their ability to help each other again as some assert.

Second, as far as OPEC itself goes, I think there may be situations in which there is a commonality of interest and we cannot rule out the possibility that there will be many situations similar to the one I will describe. We have now a Saudi insistence and a general OPEC apparent support to come to the aid of Nigeria. It strikes me that it may also be in the United States interests that the Nigerian Government be sustained. This is an important country. It has had a relationship with us which we have valued, and I couldn't begin to tell you what kind of a situation would follow if the present government were to go. That would be a real possibility if they were not sustained, so this is an example which could be multiplied over the next year or so conceivably with Indonesia and even with some non-OPEC producers, so there is a range of interests here which could well help sustain the OPEC movement.

The CHAIRMAN. I keep reminding myself and try to remind others that a marginal production shift has much greater leverage on market price, availability. A slight shortage is not matched by a slight increase in price or at least that has been our past history. Is there any reason for us to believe that we could move into a marginal shortage again without having more than marginal price adjustment? Let me go the opposite direction on the table. Dr. Conant?

Dr. CONANT. No. I agree with the assumption behind that question.

The CHAIRMAN. Dr. Eck?

Dr. ECK. I am worried about another OPEC price shock. It easily could happen.

The CHAIRMAN. Dr. Goldmuntz?

Dr. GOLDMUNTZ. I don't think I could give you a sensible answer to that question.

The CHAIRMAN. Dr. Lichtblau?

Dr. LICHTBLAU. Well, there is a possibility, but I think it requires some kind of disruption. Under normal conditions, you have no disruption, no surprises, it is difficult to see, and let's only talk about the next 4, 5 years, that there could be another upward oil shock.

If you have a disruption, and the possibility of a disruption is not insignificant by any means, you could have a price explosion, but absent that, the excess capacity in the world is such that even if you assume for the next 4 or 5 years a fairly substantial growth rate, let's say 2½ to 3 percent a year, you could not come anywhere near the pressure point where prices would be pushed up or there would be shortages where OPEC would not be willing to supply the oil.

Also, these OPEC countries have been scared by what they have seen consumers can do when prices are raised. They didn't believe it. Like Mr. Conant, I went to some of the OPEC seminars, and we were told by these OPEC ministers over and over again—if you are using too much oil, the world doesn't have it, oil prices must be raised in order to force the world to be more realistic.

Now these same ministers are absolutely staggered by what has been done as a result of these price increases. I think they will at least for the foreseeable future be careful not to create another price explosion because they realize, at least Mr. Yamani does and Mr. Khalief of Kuwait, that if it were over too long a period, it could backfire on them. It would increase the move away from oil, the development of alternate resources. In fact, as we have said earlier, one of the threats of the low price is that this movement is not being interrupted.

The CHAIRMAN. Mr. Goldmuntz, you mentioned that U.S. policy in the early 1960's helped to create OPEC and gave them reasons to be stronger.

What would have happened if we hadn't had an oil import quota program in the sixties and we had built greater dependence upon the Persian Gulf oil at those current low prices and depressed the alternative sources of oil even further when the political events did occur?

Dr. GOLDMUNTZ. That eventually caught up with us. We weren't able to produce enough, and we had to face that problem. We allowed the rest of the world to organize us rather than taking some aggressive steps ourselves. At that point it seems to me we might have rectified that. Venezuela had a point that they are a neighbor. They are an ally. They are a country we want to support, and perhaps we should have seen to it that portions of their market share were preserved at that time rather than letting the action get away from us, and I think that gets back to the point that Dr. Conant brought up.

It is also important for us to support countries like Nigeria. It is also important for us that there should be stability in the Middle East. The issue is at what price? How big an allowance do we have to pay? How much must the U.S. consumer pay? That is why I think it is that we ought to have very clearly in mind what our objectives are with OPEC, taking this stability into account. I imagine most of the countries can get along, most of the oil exporters can get along on lower budgets. We don't want to destabilize them, but we don't want to penalize the U.S. consumer.

The CHAIRMAN. How we find that balance is the test.

Dr. GOLDMUNTZ. You do, sir.

The **CHAIRMAN**. Thank you. We are going to try. We have been trying, but I think it is fair to say that there is upward pressure in the offing. I believe that economic recovery can occur. We are still fighting the battle of the budget here, and I think that has something to do with when and how well the economy recovers, but certainly marginal shifts within the range of possibility could affect that price structure, whether it be dramatic or simply incremental. I think, Dr. Lichtblau, you probably made the right response when you suggested that just increasing demand by itself wouldn't produce the massive price shift that would otherwise occur if that demand increase occurs in a period of relative political stability.

If it occurred in a period of relative political instability, then you run into that factor which really does drive the market, and that is what is a rational inventory? What is excess inventory? What is real demand? How much inventory building is there? How much competition is there for perceived scarce supplies? Those things have tremendous leverage on the marketplace, and I think that is exactly what happened at the outbreak. At the time the Shah of Iran fell from power we lost that 5 million barrels of oil. There was immediate intense competition. The spot market went wild. In that period of time people don't necessarily act in the manner in which we would in other circumstances think to be rational.

I have often used the example of people who are threatened with some kind of shortage who act rather aggressively. In the 1960's we had the great toilet paper scare. We were going to be short of toilet paper, and I saw that proverbial little old lady at a supermarket in Arlington, Va., in tennis shoes, who was walking out of the store followed by a young man with a cart carrying two cartons of toilet paper because she is darned sure going to have enough. She couldn't live long enough to use all of that, but she was buying anyway.

People react that way, and we saw some of that along with the fact that in a period of volatility I suppose you could take a supertanker and circle it for 3 days and divert it to a different port for a dollar a barrel more. You make a million dollars. That is worth contemplating if you own that oil in that tanker, so there are all of those psychological pressures that come at a time of perceived instability, and I guess that is more important than absolute levels of supply and demand in terms of massive movement of price.

That leads me to the bottom line question for myself, not only in oil policy, but in total energy policy. Which is more damaging to us, paying for too much capacity or investing in too little capacity?

Mr. Goldmuntz, your question, your response to the question focused exactly on that. How much do we ask the American consumers, American taxpayers, to pay in terms of building a sufficiently stable supply in terms of excess supply in normal times so that they don't pay too high a price in the abnormal conditions?

I think we are going through that debate in this country again primarily in the utility systems more than in the oil industry perhaps where we have apparent excess capacity now, but out in the Northwest in my home territory, Washington Public Power Supply System is having trouble and they are looking at nuclear powerplant closures because there are some people who say it is better to invest less than is needed than it is to invest more than is needed and waste that money.

Well, I would suggest that had we had excess capacity in energy in our country sufficient to offset that marginal shift in supply in 1978 we wouldn't have seen a doubling of the price of oil in 1978. How much that cost our consumers and our taxpayers in all of the period from that time to this time, let alone in the future, simply because we were penny-wise and pound-foolish, if we can use that parallel, in refusing to make investments that would have reduced vulnerability to that kind of economic shock, and yet I have people out in the Northwest who are today arguing that the utility function in a utility is best satisfied by making capital investment to the lower range of demand forecast and then making up the difference by conservation or doing without in periods of excess demand, demand that is excess to our capacity.

If human history tells us anything in recent years, it is that in the volatility of international politics and the volatility of international markets we would pay a very, very high price in purely economic terms following a policy of marginal shortage.

I think that every bit of our experience indicates it costs you less in the long run to build in the upper range of your forecast than to build in the lower range of the forecast. Could I ask for comments?

Dr. LICHTBLAU. I would completely agree with that, Senator. The only thing is it is difficult for private companies to follow that policy in a competitive market. Companies have to be concerned with earnings, with short-term profits, so that it would have to be, I think, a Government policy then to have excess capacity available as a security measure. It could not be expected as a business measure, and I think that is something we have to consider.

The CHAIRMAN. If we want it to be done for security reasons and not purely short-term economic reasons, you have to have Government policy that drives it in that direction.

Dr. LICHTBLAU. Such as the SPR, for instance, which I think should be filled.

The CHAIRMAN. We run into a dilemma because if, as a matter of fact, we produce the institutional mechanisms that reduce the likelihood of shocks to the system, we also introduce into the market decisions of the companies that are involved less of an economic incentive to take care of their own problems.

Dr. LICHTBLAU. The inventory reduction that you see on a commercial basis taking place now is precisely a reflection of this new short-term security. It may not be in the national interest or in the interest of the OECD area, but it is in the interest of an individual company.

The CHAIRMAN. Are there further comments?

Dr. GOLDMUNTZ. In my testimony, Mr. Chairman, I did have three sentences or four sentences pertaining to that, a Federal role or support for a multilateral institution to promote oil proliferation as a requirement. The correct world capacity for oil production based on economic criteria is undoubtedly less than the correct world capacity for oil production based on national security interests.

The private sector is not and should not be responsible for national security interests. This Federal role could take the form of bilateral long-term purchase agreements to bring on marginal capacities in areas that serve our strategic interest. Such purchases could be used in part to fill the strategic petroleum reserve. I think that is the approach one should take to this requirement.

That is going to cost us some money. People have estimated that an appropriate tariff, recognizing the risk of imported oil, is anywhere from $5 to $50, depending on your set of assumptions. It is a very broad range, but that is an indication of the kind of money that we should be spending in that general direction.

The CHAIRMAN. Dr. Eck?

Dr. ECK. I am a little concerned by the apparent dichotomy between Federal storage and private storage. Our private storage is primarily for seasonal purchase. Essentially we have to always be ready for the 100-year winter which we start at every year, but this primary motivation for storage is seasonal, and then there are some operational problems. What if the Swiss Canal goes down or whatever it is? But we really don't maintain in industry a national catastrophe storage. We just don't have that, and so frankly I can't see any impact of the increase in SPR fill on our inventory policies whatsoever, just none. In fact, you could almost argue that in theory it would be the other way around; that if we really thought there were a big enough Federal program, then we might be encouraged to have more private because one of the fears we have had with private stocks is in the event of an emergency someone would take these private stocks and nationalize them or whatever, so I really don't see an impact that is adverse on private inventory behavior.

The CHAIRMAN. Some governments have already moved to require that industrial users maintain some level of stocks. Do you regard that as an undue interference in the marketplace that we should not indulge ourselves in?

Dr. ECK. Yes. It hasn't worked in the areas—it is the Europeans basically where we see this behavior. The Europeans recently decided they wanted to reduce stocks for financial reasons, so it isn't working well in the European experience at all.

In general, as Dr. Lichtblau has commented, there are social values to having strategic stocks. It is agreed among economists these are activities that governments best perform whereas industrial stocks are commercial and primarily seasonally related.

The CHAIRMAN. They certainly have been, but during the period of shortage in 1974 and again in 1978-79, many industries found some very good economic reasons to build inventories.

Dr. ECK. OK.

The CHAIRMAN. That was not Government ordered. It was in response to their own perception as to what was economically sound for them.

I guess my dilemma here is whether or not there is a line which you can draw at any level which says that businesses that might otherwise find it prudent to build or hold inventories above the seasonal adjustment level under the circumstances are relieved of the perception of need, and the real need to do so by governmental action. If we are doing nothing with respect to SPRO, wouldn't some industries then begin to build some inventory? Wouldn't they feel the pressure of availability uncertainty?

Dr. **Eck**. There is no evidence if we look at secondary stocks, for example, of industry, that although the strategic petroleum reserves have been built up and admirably over the past year, we have seen industry rapidly liquidating stocks for commercial reasons.

The **Chairman**. But they do it for commercial reasons and also because in a period of perceived oil glut they don't find economic reasons that justify tying the capital up in those inventories. The same question is classic throughout business. Do you do business with the local hardware store that has a lot of money tied up in inventory that turns over very slowly, or do you order it all by mail from a central warehouse where their turnover is much more rapid? How much do you pay? How much does the consumer pay for the convenience of taking it off the shelf instead of waiting until it is obtained from a source some distance away?

In that instance, the consumer makes the ultimate choice which is worthwhile to him, and people are either in business or out of business based upon that consumer's choice of value, but we don't have quite the same luxury. I don't believe we have quite the same luxury in terms of international energy supplies when as a matter of fact the wrong choice, guessing wrong, doing the wrong thing in terms of what actually happens, not what we guess will happen, might lead to a war in which young people of this country and others die. There it seems to me is an imperative that is great enough for us to at least consider the extent to which government ought to be involved in making certain that we reduce the risk of that event.

I have often said that President Carter, whatever else may have been said about him, I don't know anyone who would have charged him with being a warmonger, but when the war between Iran and Iraq broke out, President Carter warned the world that we would if necessary go to war to protect the supply of that oil. He wasn't kidding. A lot of people didn't focus on that statement as carefully as they should have, but nations go to war when their survival is threatened, and the availability of that oil threatens the survival of our economies in this country and in Europe and in Japan, and if anybody believed that they could interfere with that oil supply without us going to war, they are making a very, very dangerous calculation indeed. If that is reality, then it seems to me that there is a social reason, a national purpose involved in trying to avoid the conditions which might lead to that response.

How much money do you invest in it? Whatever you do, the whole idea of the entire military establishment here is not how to win a war but how to avoid one, have enough military capacity so that nobody will attack. Why don't we do the same thing with respect to energy? Why don't we make sure that we have enough energy available to us in our society so that we don't have to go to war to obtain it, and if we would just look at the urgency of energy supplies in that light, it seems to me that we would take different actions with respect to national energy policies.

That doesn't mean we would all agree upon what those actions are or should be, but at least we would then be in agreement that some action ought to be taken.

Mr. Goldmuntz, on the second page of your testimony you suggest that in the event that the market share of the Persian Gulf producers fell significantly that they would retaliate through a price war in order to destroy competition from alternative fuels.

Dr. GOLDMUNTZ. I was drawing an optimistic scenario there that there was peace in the Middle East, that the OPEC nondiscretionary producers—Iraq, Iran, Nigeria—came on to this January 1980 levels. New horizons opened up around the world because the price was high, that if you look at the market share—and also we maintained our fuel switching and conservation tendency at perhaps one-half of the rate of the past 2 years. There was some increase in demand due to GNP, perhaps a 50-percent GNP for a while, and then you look at the residual demand for the discretionary producers in the Persian Gulf. Those that don't need money, it turns out the demand for their oil decreases markedly under that set of assumptions from something like 13 million barrels a day down to 7 toward the end of 1983, and down toward a preposterous 1 million barrels a day by 1987. Of course, that is a scenario that is not going to happen because what will happen is that those countries that have the lowest cost of production will lower the price.

The very act of lowering price causes conservation efforts in the oil consuming countries to deteriorate, causes the incentives by oil companies to develop new and more expensive systems to deteriorate. It causes fuel switching to deteriorate, and so that the price mechanism would be the thing that would bring that scenario back into balance. That is a central one. I would welcome a price war down to $20 a barrel.

The CHAIRMAN. But you don't anticipate it?

Dr. GOLDMUNTZ. I don't know. It is on the one hand and on the other hand.

The CHAIRMAN. Somebody said what we need is one-armed economists.

Dr. LICHTBLAU. Or three-armed.

Dr. GOLDMUNTZ. If you had them, you couldn't believe them either.

The CHAIRMAN. Dr. Eck, you indicated that in your opinion we ought to be building reserve stocks. You point to the use of surplus large tankers and steel tankage. Do you have any estimates of the amount of storage space that might be available through those means and the cost that might be attached to using that?

Dr. ECK. Our tanker surplus is just immense. Easily one could lease 300 million barrels equivalent, so we are going to run out of money far before we run out of VLCC's to put crude in. There is no trouble whatsoever leasing.

The CHAIRMAN. The best way to find out the cost is to put out a proposal and solicit bids?

Dr. ECK. Exactly. That is the one I was going to suggest in the tankage. There has to be spare tankage. Again, we know we have drawn down inventories, 100 million or more, and worldwide we have come down 5 or 6 hundred million, so that those tanks are available. They are available at some reasonable cost.

On the tankers, as I suggested, I am aware of tanker charges going as low as a dollar a barrel a year equivalent, so it is going to be awful tough to find anything that is going to be cheaper than the VLCC.

The **Chairman**. You suggest some of those tankers will move to scrap?

Dr. **Eck**. That's it. The tanker rates are so low that the owners just can't afford to pay the freight.

The **Chairman**. Rather than leasing them we ought to buy them?

Dr. **Eck**. That may be true. I am fearful they will just be scrapped and we will end up with a shortage of tankers.

The **Chairman**. Buy it for 1 percent over their scrap value. How would that be?

Dr. **Eck**. There is no problem meeting whatever moneys could be made available. There is absolutely no trouble finding the steel tankage.

The **Chairman**. Mr. Goldmuntz, you mentioned one of the actions we might consider taking is the attaching of an import fee to oil. My major concern with that is we have just gotten out after a period of time where we had an oil industry in which part of it was controlled differently or priced differently than other parts of the industry. During this period we found that as we had the controlled prices of oil at a lower price than that coming from outside the country, that those refiners, jobbers, marketers, retailers, that had their sole source of supply from outside the United States were at a very great competitive disadvantage with those that had all or a higher proportion of domestic production. Naturally when you ran across that kind of a situation, whether it be the one that the public sees, two service stations on opposite corners with 10 or 15 cents a gallon differential, there were the other hidden disparities between refiners and jobbers or wholesalers, all coming to the Government and saying look, you have created an economic imbalance that is destroying our ability to stay, to survive in this market. Now you have got to do something to equalize that economic burden, and if there was one thing that was a fiasco in the recent past that grew out of our price controlled structure it was the entitlements program which was the Government's response to try to equalize economic imbalance imposed by Government.

Wouldn't we run into the same question if we had an import fee on imported oil?

Dr. **Goldmuntz**. Not necessarily; it depends on how you propose the import fee. You have to impose it on product and on imports, and you have to let domestic prices rise so that you would have a single-tier market, and I agree with you. It is essential if you are going to do this to have a single price for product and for crude in this country, and it can be done in that way.

The **Chairman**. I understand what you are saying. That may be just as highly theoretical as your best case. However, when you look at the political pressures that would allow our policies to have the oil companies make more money, there are people who don't want the oil companies to make more money. Of course, we could do that by taxing that profit away from them.

Dr. **Goldmuntz**. You are doing it all right, and it is an incremental profit, and I know that.

The **Chairman**. We can tax them. Isn't that a real tax on the consumer, however, if we do both?

Dr. **Goldmuntz**. Yes.

The **Chairman**. The consumer pays it in the higher price. The Government may get it back. We could do what OECD has done in some instances in agriculture product. They impose a border tax that is enough to pay the internal subsidy.

Dr. **Goldmuntz**. There is one thing about this tax. It is a tax on the consumer. You have got to recognize it as that. If you are worried about the hazard due to oil supply, you have to tax oil. You can't tax energy in general. I think, however, it is the one tax that I know about, the one excise tax if you will because that is what it is with respect to the consumer that you have a chance of recapturing from somebody else. To the extent that this tariff would decrease U.S. oil imports, then to that extent you are pushing OPEC further and further toward the place where Saudi Arabia can no longer control the prices, and then you may have a drift in prices down toward the cost of the marginal producer, so if you have to impose taxes for budgetary reasons, I would prefer to propose a tax that somebody else may pay rather than the citizens of this country.

The **Chairman**. That's the only fair tax there is, isn't it?

Dr. **Goldmuntz**. Absolutely.

The **Chairman**. A tax that somebody else pays.

Dr. **Lichtblau**. I would disagree with that. I don't think if we put in an import fee that the OPEC nations would reduce their prices accordingly in order to absorb the fee. There is no need for them to do this because if all of the OECD nations did it, I think that then they may have no choice, but if we do it, and I don't think there is any chance that Europe or Japan is going to raise its oil price above the world level, we do it alone, we are talking about two, three hundred thousand barrels a day maximum reduction in oil demand, and that is simply not big enough to affect world oil prices, so the assumption is that a $5 import fee means $5 more for every barrel of oil, 12 cents more for a gallon of gasoline. There is no way we can shift it to anybody else.

Dr. **Goldmuntz**. May I respond to that?

The **Chairman**. Surely.

Dr. **Goldmuntz**. First of all, our trading partners in OECD have an effective tax on imported oil that is considerably higher than our own. They express it in a different way in their excise tax at the gasoline pump. They don't put it on distillate, and I don't believe they put it on residual, but if you take into account their product mix and their taxes and their effective taxes on imported oil are already higher than ours, and they keep telling us why don't you take that step? Why don't you tax your imported oil at least at the same rate that we tax our imported oil?

Now the amount of cutback would be a function of the tax, and it will also be a function of a number of other things, but the estimates that I have seen, I am not sure they are very good. They depend on macroeconomic models. If you have a $5 tax, eventually it will be 500,000 barrels. If you had a $10 tax which still is a gasoline tax that is much less than what our OECD partners impose, you have a million-barrel cut in imports over a period of time.

Now nobody can say what will happen in the international oil market as a result of that precisely, but what they can say is that it is moving things in the right direction, and that is good enough it seems to me for policy. It is moving things in the right direction. It is decreasing our dependency on imported oil for what I think is a nominal price.

The CHAIRMAN. Are there other comments?

[No response.]

The CHAIRMAN. Well, I appreciate your comments. I am not sure I agree. I have had the feeling all along that in the period of declining market, in a period of softness as we have now where it is a buyer's market, not a seller's market, you can impose a fee that might be simply passed on to the consumer. But it seems to me if we get into a position where OPEC again has a better hold on the market because world demand has increased relative to supply to the point they can affect prices more directly, they might well say if you can afford to pay $5 more for our oil, we will charge you $5 a barrel more for our oil.

Then there might be a major price increase as well, and we would effectively double the price of the imported oil, and if we allowed the market to function freely, then not only would we have that increase in taxes on the domestic consumers, domestic producers, but also there would be tremendous political pressure to tax away the differential for a couple of reasons.

The windfall profit tax was not really because people hated oil companies, although I think oil companies were of the opinion that that was the reason. It really sprang from the desire on the part of Congress to find new revenues so they didn't have to cut social welfare spending. That pressure hasn't reduced. The pressure is greater. They are desperately looking for revenues, and we are not even talking about the imposition of an oil import fee on the basis of energy policy or an international policy or economic policy.

We are talking about it as relief to the budgetary crisis, precisely the same thing that led to the imposition of the windfall profit tax in the first place. If prices were to continue to decline, I would think it might be a possibility, but I don't expect that to happen, and particularly I would not expect that to happen if we impose the fee.

I would like to note for the record that Americans for Energy Independence is submitting comments for the record, that Dr. Bergman, director of that group, is in the room, and I wanted to acknowledge the contributions being made to the record from that area.

The record will remain open for 30 days for additional comments, and I would also like to note that there may be some additional written questions for some of the witnesses. I hope you can respond in writing in a reasonable timeframe so that we can include those questions and comments in the record as well.

I thank all of you very much for the hearing this morning.

[Whereupon, at 1:15 p.m., the hearing was adjourned.]

[The prepared statement of Dr. Bergman follows:]

Statement of

DR. ELIHU BERGMAN, EXECUTIVE DIRECTOR
AMERICANS FOR ENERGY INDEPENDENCE

Submitted to the

COMMITTEE ON ENERGY AND NATURAL RESOURCES
United States Senate

April 23, 1982

Mr. Chairman:

On behalf of Americans For Energy Independence (AFEI), a national public interest organization, I appreciate your invitation to share our views on the world petroleum outlook, and the factors that may influence the global petroleum system in the near future.

We enter this perilous exercise with some trepidation because the route is littered with expert projections and scenarios which were reasonable at the time they were developed--and obsolete by the time they were printed.

Nevertheless, we at AFEI feel that however imperfect, however short-lived, or however frequently refined, forecasts of the world petroleum outlook provide an essential framework for decision-making about issues of national interest, including national security, foreign policy, and economic well-being. As this Committee has done at regular intervals, you are performing a valuable public interest service by providing a prestigious forum in which these issues can be discussed.

We at AFEI are concerned not only with taking the measure of the near term outlook but, more importantly, with reflecting on what it means in terms of the U.S. national interest. The current world oil outlook is seductively attractive, particularly after nearly a decade of multiple adversities created by the different stages of the international energy crisis. Domestic gasoline prices are down dramatically. Domestic oil consumption is down by 8 percent and imports by 38 percent from a year ago. The OPEC producers are breaking ranks in a frenzy to sell their product and the non-OPEC producers are producing more oil, taking a larger share of the market. The prospects are that in the next five years producers in and out of OPEC will be producing even more oil--all of which they will be anxious to sell.

But there is a reverse side to this bright picture, a side which, unfortunately, few Americans want to hear about. With precious little good economic news these days, small wonder that people are not inclined to listen to the Cassandras who insist on reminding them that gasoline at 99 cents a gallon might not be all good.

The reality is that whatever the outward manifestations, the near-term oil outlook still is perilous to prospects for U.S. energy security. Let me briefly summarize our perspective on the key element in the oil scene in terms of U.S. interests, and what must be done to increase our national advantage. The major threat to U.S. interests during this period is not a deliberate production cutback coupled with a surge in demand for oil. Given a predictable market environment, there will be increasing production of oil from a greater variety of sources coupled with a continuing reduction in the oil requirements of the major industrial countries--consumers of 60 percent of the world's oil--and a continuing leveling off of the rate of oil price increases. But the market environment and the related physical conditions of oil supply and demand are not the controlling and relevant determinants of oil requirements.

The key factor in the oil equation is the political environment prevailing on the Persian Gulf. Sudden changes in this unpredictable and volatile environment would create interruptions in the oil marketplace that would impose serious consequences on the Western alliance. It is, therefore, to the contingency of unforeseen supply interruptions that U.S. energy policy should be addressed. Our objective during this decade must be the elimination of any impact that a temporary, or even a longer term, withdrawal of Persian Gulf supplies would impose on the world oil system. And the objective is within reach if we continue working at it. Our success in exploiting this opportunity, or our failure to do so, will be a major determinant of the political and economic fortunes of the Western alliance during this decade and beyond.

The determination of the Iranian regime to parlay recent successes in the war with Iraq into a resurrection of the Shah's ambitions to dominate the Gulf, coupled to the internal disruptions resulting from modernization on a lavish scale run amuck, threaten the stability of the Saudi regime. Since 1977, at least 20 military insurrections in Saudi Arabia have been identified and reported. There probably were more that went unreported. This is a record of instability that beats Bolivia, which, over the years, has distinguished itself as the most coup-prone country in the Western hemisphere. Under the circumstances, the day-to-day future of the Saudi regime is an open question, and we would be imprudent to base our energy planning on a dependable supply of Saudi oil. The reverse is the more likely prospect and nobody can forecast whether a Saudi supply interruption will be temporary, or for how long, or by how much. But we had better plan on it.

The near-term physical outlook for oil will be determined by conditions that have evolved during the past two years--since 1979, when global oil demand peaked. On the demand side, a transition away from increasing oil usage has taken hold in major oil-consuming nations. Between 1979 and the end of 1981, oil demand declined by 15 percent in countries that consume 60 percent of the world's oil.

On the supply side, new sources of oil have expanded choices for consumers and competition among producers. The new and increasing supply sources have come onstream in countries that are hard pressed to sell all the oil they can market to sustain developing (e.g., Nigeria and Mexico) or depressed (e.g., Britain and Soviet bloc) economies.

By early 1982, the world oil market was characterized by an excess supply capacity of 8 million barrels per day. All of this oil is immediately available, most of it from producing countries under economic pressure to sell rather than to conserve.

These physical conditions bias the near-term oil market in favor of the buyers, provided the buyers acknowledge their advantage and pursue it, as they have not done in the past. But until requirements for discretionary oil production, e.g., approximately 5 million barrels of Saudi and other Persian Gulf oil that does not have to be sold, is permanently removed from the market, the buyers' advantage is ephemeral. And in the likely event of a political upheaval on the Gulf, all bets about physical conditions, market advantages, and the rest, are off.

By permanently wiping out the demand for about 5 million barrels of oil a day--less than 10 percent of total world consumption and about 14 percent of Western alliance consumption--we can achieve permanent protection against a Persian Gulf shutdown and restore oil to the position it occupied 10 years ago as just another commodity traded in the world marketplace.

While addressing the contingency of an unforeseen supply interruption, U.S. energy policy now should simultaneously exploit the existing near-term disadvantage of the producing countries, reflected in the clash raging in OPEC between the needy and discretionary producers, with the objective of creating a permanent market advantage for the major consuming countries.

On the demand side, the predominant near-term influence in the global system during the balance of the 1980s will continue to be the declining oil requirements of the major industrial countries.

Of the 60 million barrels of oil consumed in the world today, the United States and our Western allies, with 17 percent of the world's population, consume 60 percent of the world's oil. Of that amount the United States consumes nearly half. At this level of oil consumption, what the United States and our allies do to change oil consumption patterns creates waves, not ripples, in the world system.

Between 1970 and 1979, oil demand in the industrial countries increased by 19 percent, but at a declining rate. By 1980, the annual increases in demand were reversed, with declines of 4 percent in 1980 and 5 percent in 1981. This pattern of decreased oil usage is continuing into 1982 and will most likely continue through this decade.

Obviously, recession in the Western economies was a factor in declining oil demand--nobody knows how much--and a restoration of economic health will influence demand--nobody knows how much--but the increase in demand is not likely to revert to pre-recession levels. This is because the Western energy systems are undergoing a structural change involving increasing use of oil substitutes, coupled to more efficient use of oil. In the United States, for example, the Department of Energy reported that the energy/GNP coefficient declined from 59.4 thousand Btus per GNP dollar in 1972 to 46.7 in 1981, a 20 percent reduction of energy usage per dollar of economic output.

Complementing reduced energy coefficients in the United States and other industrial economies, the cumulative impact of increasing and continuing oil substitution is a significant influence in the oil outlook. During the 1973-80 interval, for example, natural gas usage in France, Germany and Italy increased by about 60 percent, and in Japan by 30 percent. By 1980, natural gas comprised more than 20 percent of the energy mix of the Big Seven consuming countries, up from 14 percent in 1973.

Coal usage increased by 17 percent in France, 13 percent in Italy and 32 percent in the United States. By 1980, Big Seven coal consumption was up to 18 percent of the energy mix, from 12 percent in 1973.

On a smaller scale, nuclear energy is emerging as a meaningful substitute for oil, with usage in the Big Seven systems rising from the equivalent of 0.8 million barrels of oil per day in 1973 to 2.6 million barrels of oil per day in 1980.

While the decline in the oil consumption of the non-Communist industrial nations exert a major impact in global oil demand now, the rapidly growing requirements in the Communist and developing countries inevitably will exert increasingly significant pressure in the longer run. By contrast to a 19 percent increase in oil demand in the industrial West between 1970-1981, which now is declining, the increasing demand in Communist countries grew at a rate of 95 percent and in the less developed countries by 73 percent during the same interval.

By contrast to the major industrial nations, the less developed countries, with 53 percent of the world's population, consume about 17 percent of the global oil supply. And all the Communist countries together including the largest one in the world--China with a population of nearly one billion--consume about 26 percent of the world's oil, the same amount as the United States alone. China, with 22 percent of the global population, consumes only 3 percent of the world's supply of oil.

Clearly, there is room for significant growth in oil consumption in the Communist world, particularly in China which has embarked on a major program of industrial modernization. Within the European countries of the Soviet-dominated bloc, the major pressure for increased consumption is created by the built-in energy inefficiencies of their economic systems, which require more energy per unit of output than Western economic systems. Most of this energy has to be supplied by the Soviet Union.

As economic problems leading to political crises occur, as they have in Poland, there is more pressure on the Soviets to supply additional energy to keep the economic systems running and thereby bank down political disruptions. That is why energy consumption, including oil consumption, between now and 1990 will rise in the Communist bloc.

Meanwhile, the current financial requirements of major oil-producing countries is the principal near-term determinant of oil availabilities. During the 1980s oil production will be chasing rising financial requirements, which provide the incentive for maximum production and, with the exception of Saudi Arabia, Kuwait, the Emirates and Libya, exclude discretion in manipulating levels of production.

The significant near-term increases over current levels of oil production will come from those groups of producers with compelling economic and political incentives to maximize production:

1) The "catch-up" producers who now are aggressively attempting to restore former production levels--this group includes Iran, Iraq and Nigeria, with an aggregate potential for adding 5 million barrels per day.

2) Producers in a position to increase production from expanding reserves--the most likely source of increase in this group is Mexico, which has investments in place to increase production from present levels by 2 million barrels a day by 1985.

3) New producers who will initiate significant production during the next five years--countries on the Gulf of Guinea, including Ghana, Ivory Coast, Zaire and Cameroon, have a potential for adding about 1 million barrels per day.

Clearly, the supply/demand relationship suggests an abundance of oil at competitive prices in the near term. But, equally clearly, this potential advantage for consuming countries is an ephemeral condition, at the mercy of political uncertainties over which we have little control and which could totally disrupt the relationship and subvert the advantage. This is why the first order of business for U.S. energy policy is the reduction of our exposure to these uncertainties, and the transformation of a present stroke of good fortune into a permanent market advantage.

To do so, we must permanently eliminate the critical demand for the most vulnerable oil source, Persian Gulf oil, so that its blockage or interruption will become marginal to the interests of the Western alliance. The current surplus condition in world oil markets, and its prospective continuation in the near term, provide the most favorable climate in which to seize the initiative.

The combination of advantages and dangers associated with today's oil glut determines the agenda of actions required to maximize our advantages and minimize our dangers. The principal objectives of U.S. energy policy must be the restoration of oil to the role of a conventional commodity traded in world commerce, devoid of any overriding economic or political value, and a reduction in the requirement for Middle East oil. A classic oil market should involve an adversary relationship among suppliers, competing with one another to sell their oil--not buyers competing for the product or deferring to sellers to obtain it. This authentic oil marketplace can be achieved by decreasing global oil demand approximately 5 million barrels a day--less than 10 percent of current world consumption. Such a reduction in demand would eliminate the remaining discretion currently enjoyed by a few producers (Saudi Arabia, Kuwait, United Arab Emirates, and Libya) who can raise or lower production at will. Because of our clout in the world oil market and our access to oil substitutes, the United States can play a key role in achieving this target.

With these opportunities at stake, now is the time for the United States to mount an offensive that will once-and-for-all eliminate the power that foreign oil producers have enjoyed for nearly a decade. The offensive involves several interrelated targets:

- Decreasing U.S. oil imports
- Increasing competition among foreign producers for access to the residual U.S. import market
- Providing advantages to selected foreign producers, principally those outside the Middle East, that would confer a preferred access to the U.S. market.

In pursuit of these objectives, the United States must intensify efforts to reduce oil consumption through greater conservation, rapid substitution of alternatives where oil is not essential, incentives for further reduction of oil imports, and the increased and accelerated production of all domestic energy resources. This is no time for backsliding.

Creating an energy offensive clearly requires leadership and involvement by the federal government. If this government role is not to be expressed through a federal department, then something equal or better should be devised to do the job. Bureaucratic interior decorating in response to campaign commitments, well-intended at the time but now obsolete, is not an adequate expression of the remaining government responsibility. Energy is still a national security issue.

Now is the time to exploit a unique opportunity. Walking away from that opportunity and responsibility would be an act of national folly.

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